

AUTOMOTIVE INDUSTRIES

The AUTOMOBILE

Vol. XLIII
Number 21

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Star City	7	1	Audubon	3	10
State Line	1	4	Aurora	3	1
Stettin	1	1	Austinville	1	6
Stewartville	1	1	Avery	2	18
Stillwell	6	20	Avoa	1	1
Stockwell	1	1	Ayrshire	1	1
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Sullivan	35	131	Baldwin	28	10
Sunman	1	1	Bancroft	10	10
Sunnyville	1	14	Barnes City	2	1
Swanton	1	1	Bartlett	26	16
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Syracuse	73	70	Battle Creek	2	2
Tad	1	1	Baxter	2	2
Talbot	1	1	Bayard	1	1
Teggarden	2	1	Beas	1	1
Telf	10	22	Beacon	1	1
Templeton	1	1	Beaconsfield	19	17
Terre Haute	227	1,893	Beaman	49	62
Thayer	8	1	Belknap	1	1
Thorntown	3	1	Belleplaine	170	167
Tioga	2	1	Bellvue	50	25
Tipton	2	60	Belmont	30	42
Tippecanoe	1	1	Bennett	12	1
Topeka	43	43	Bernard	1	1
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Union City	4	1	Blanchard	1	1
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Union Mills	40	1	Blawie	2	33
Upland	1	1	Blakesburg	1	15
Urbana	2	1	Blockton	1	1
Valentine	1	1	Bloomfield	84	91
Valparaiso	481	735	Bond	1	1
Van Buren	4	20	Bonair	1	1
Veedsburg	161	39	Boonville	24	8
Vincennes	1	712	Boone	186	85
Vladis	1	1	Boonville	2	6
Wabash	121	291	Bradyville	1	1
Wadena	1	1	Bradford	1	10
Wakarusa	1	14	Bradgate	1	1
Walkerston	45	50	Bradley	1	1
Walton	1	1	Breda	1	1
Wanatab	35	24	Bremers	1	1
Warren	1	1	Briarcliff	1	1
Warsaw	287	455	Bridgewater	1	1
Washington	19	61	Brighton	56	48
Waterloo	7	26	Bristow	1	1
Wawawai	1	1	Brown	33	20
Wawaka	2	1	Brook	1	1
Wawasee	1	1	Bromson	1	1
Waynetown	1	1	Brooklyn	34	46
Wayland	1	1	Brooks	1	1
West Baden	43	110	Brvant	1	1
West Lafayette	14	1	Buckingham	4	1
West Lebanon	1	36	Buena Vista	1	1
West Point	1	1	Buena Vista	1	1
Westfield	46	30	Buena Vista	12	30
Wheatfield	22	1	Buckeye	1	1
Wheeler	8	35	Burdette	1	1
Whiteland	1	1	Burton	492	1,607
Whitins	290	570	Burnside	1	1
Williamsport	21	74	Burt	1	1
Winamee	64	81	Buxton	10	98
Winchester	1	1	Calder	1	1
Wingate	1	1	Callender	1	1
Winona Lake	14	4	Calmar	40	68
Winthrop	1	1	Camanche	1	1
Wolcott	17	27	Cambria	1	1
Wolcottville	6	1	Campbell	1	1
Wolf Lake	1	1	Camp Dodge	1	2
Wood	1	1	Canton	1	1
Worthington	1	1	Carroll	1	1
Total	17,440	40,102	Carroll	1	210
IOWA					
Ackley	37	68	Carrollville	1	1
Adair	1	15	Cascade	23	28
Adams	6	8	Cass	1	1
Afton	16	26	Cedar Falls	192	318
Agency	35	15	Cedar Rapids	908	8,448
Alexandria	44	32	Cedar Point	1	1
Akron	1	1	Centerville	1	1
Albert City	4	1	Center Point	1	1
Albia	161	285	Centerville	164	351
Albion	2	1	Central City	5	2



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AUTOMOTIVE INDUSTRIES

The AUTOMOBILE

VOL. XLIII

NEW YORK—THURSDAY, NOVEMBER 18, 1920

No. 21

Germany Soon to Be Bidding for Export Trade

Leader of Central Powers is still suffering from war shock in automotive production and use, but is rapidly pulling together the facilities and trade wisdom that once made it a world-wide sharp competitor.

By W. F. Bradley

COMPARED with Paris, London or Brussels, the first impression received in Berlin is that the use of automobiles has ceased. This impression is increased by a more extended tour through Germany. During a period of two weeks spent in that country, when every important town was visited, only two automobile touring parties were observed: one of these was Italian and the other Swiss, and they appeared to have just come over the frontier into the remote corner of Bavaria in which they were found.

In the big cities a limited number of taxicabs are in service, but in practically every case they are outnumbered by old horse cabs. In Berlin the only automobiles in use appear to be owned by members of the Allied Missions. In the frontier towns of Cologne, Coblenz and Mayence there is a certain amount of automobile traffic, but examination shows that this is practically all confined to civil or military members of the varied Allied Missions. In the big provincial cities, such as Munich and Leipzig, it can be declared that the use of private automobiles is practically unknown.

Germany has placed an embargo on the use of passenger-carrying automobiles, but gives special permits in individual cases. Undoubtedly, by the time

these lines appear in print, this restriction will have been removed, but it is doubtful if this will cause any increase in automobile traffic. The high initial cost of automobiles, the 15 per cent luxury tax on their purchase price, the heavy State taxes, the scarcity and the cost of gasoline and tires are in themselves sufficient to restrict the automobile movement without any Government decree.

Gasoline is officially sold at 4 marks 50 per litre, or at nominal rates of exchange \$4.25 per gallon. It is impossible, however, to obtain it at this price, and even when a higher price is paid, it is only obtained with difficulty. Few German automobiles can be bought at less than 200,000 marks, or nominally \$50,000—the pre-war value of the mark was 23.8 cents. Benz lists their smallest car, an 8 hp. four cylinder, at 62,308 marks for the chassis without tires. With a 6-passenger body, electric lighting and starting, speedometer and tires, the list price of this car becomes 139,124 marks. An 18 hp. four-cylinder car with open touring body, Bosch electric lighting and starting, tires and demountable rims, is listed at 200,000 marks. Nominally this is equivalent to \$50,000, at which price it would, of course, be unsalable abroad. At the rate of exchange at this writing the price is only \$3,000. These two examples are given as



Close up view of disappearing top on N. A. G. automobile

an indication only of prevailing prices, and in order to show the difficulty Germany has to do business on her home market.

According to the latest Continental Tire Co.'s price list, a set of four tires 34 x 4½, cost 13,800 marks, or practically \$3,450 at normal exchange. The following are the list prices of the most commonly employed dimensions, and to these a 15 per cent increase must be added:

	Casings.	Tubes.
710 x 90	1535 Mks.	170 Mks.
815 x 105	2282 "	240 "
820 x 120	2531 "	275 "
895 x 135	3165 "	322 "
895 x 150	3741 "	365 "

The truck industry is seriously handicapped by high purchasing and operating costs. Compared with America or such European countries as France and England, the number of trucks in service is very small. They are practically all army type 3 and 5-tonners, the latter nearly always being used with a trailer. Trucks are used for local haulage only, the long distance services which are common in France and England appear to be unknown in Germany. Numbers of the trucks in use in Germany are obviously army vehicles and are being run with the steel types imposed by war conditions. Berlin has a small number of motor bus lines, the vehicles used being either Daimler or N. A. G. lightened 3-ton chassis, carrying double deck bodies. There is no use whatsoever in Germany of trucks with giant tires.

Generally throughout Germany the taxicab business is in the hands of men who own their own cabs, the vehicles thus being of the most diversified makes and types. There appears to be no specialized taxicab chassis, such as constitutes a feature of London and Paris. Electricity being comparatively cheap, electric taxicabs are employed, particularly in Berlin. All these are vehicles built before the war. The use was noted in Berlin of a diminutive single-seater electric for city work only. This is a very small and light four-wheeler, just capable of carrying one person and maintaining a speed of about 12 miles an hour on good city streets. It is manufactured by the Der Kleine Elektrische Wagen Co. of Berlin.

Another unusual type of vehicle, used rather more for business than for pleasure, is a three-wheeler with twin or four-cylinder air-cooled engine driving to the front wheel. There are two principal makes on the market, the Phanomobil and the Cyklonette. Their essential features are the same: a twin or four-cylinder motorcycle type of air-cooled engine mounted above the front wheel and driving this latter by means of a chain. The power

plant steers with the wheel by means of tiller control. The whole of the mechanism is exposed.

Automobile imports into Germany are forbidden, thus the only foreign cars to be found are those of pre-war importation. They are mostly French, with a sprinkling of Fords. The cars of the Allied Missions can only be looked upon as temporary importation.

German exports are allowed under license from the Government. Each individual export must be submitted to a departmental office, which has the right to refuse the permit if the conditions and price are not satisfactory. The factories are working almost exclusively on export business, and this is being done in practically all cases at present rates of exchange. It is only because of the low value of the mark that Germany can sell her automobiles abroad.

The reports that Germany insists on pre-war rates of exchange are not correct, at any rate so far as the automobile industry is concerned. At the time this inquiry was made the value of the mark had improved on most foreign markets, having risen to about 1½ cents in American currency, and already manufacturers were beginning to complain that it was difficult to compete abroad. With the high value, in marks, of an automobile, only a slight improvement in the rate of exchange tended to upset foreign values and make business difficult.

Technically there is little that is new in the German automobile industry. In practically every case the cars now being produced are duplicates of those built in 1914, with the addition of electric lighting and starting. Before the war Bosch had perfected his lighting and starting sets and every German manufacturer is now making use of these, but they have not been incorporated in the original design and even now are only put on as an extra.

The explanation of this apparent stagnation in design, compared with the important changes made in other countries is that after the defeat a wave of pessimism swept over Germany, and this alone was sufficient to prevent engineers getting out anything new. Further, with general conditions so unsettled, the home market difficult and much of the foreign market gone, there was no incentive to produce anything new.

It was necessary, too, to find employment for the workers, for the law forbade the factories to dismiss the regular hands except under certain well-defined conditions, and this law could only be complied with by going ahead on old designs.

The claim is made that engines are much more efficient than before the war, but it is admitted that design is old-fashioned and that the new models, on which the experimental departments are now working, will not be in production for a couple of years. No indications are forthcoming as to what these new models will comprise, and very close secrecy seems to be guarded over their features.

Real progress seems to have been made in the matter of fuel economy, and this is not surprising when the full facts are learned regarding the hardships the Allied blockade inflicted on industrial Germany. Compelled to economize in every possible way, the fuel question was studied most closely.

To give one particular example, the Benz engineers claim that with their six-passenger four-cylinder touring car, measuring 2.9 by 4.7 in. bore and stroke, the gas consumption is guaranteed to be equal to 34 miles per gallon on the open road, and

27 miles per gallon for city work. While the engine is small, the car is full sized for the stipulated number of passengers, and the construction is on the usual substantial German lines.

No opportunity was given of verifying these figures, but from conversation with owners who have had this and similar types of cars in service the claim does not appear to be exaggerated.

The average German car at the present time has four cylinders with fixed L head.

It has high-tension magneto ignition, forced or circulating oil system, cooling by means of pump, and is mounted on a subframe.

The gearbox contains four speeds and reverse, and is entirely separate from the engine.

Generally the drive shaft is enclosed, a single universal joint is used, the rear springs are shackled at both ends, and central drive is adopted.

The gas tank is at the rear and gasoline is brought to the carburetor by means of exhaust pressure.

Not a single engine was found with a detachable head; there are no 8 or 12-cylinder engines; there were very few cases indeed of unit power plant; lighting and starting sets were not built in with the engines; battery ignition is not used and will have a hard fight to gain admission in the home of Bosch; spiral bevel gears are being experimented with and, although not employed, it was admitted they will be used very shortly.

There are very few cars with Hotchkiss drive and none with front wheel brakes.

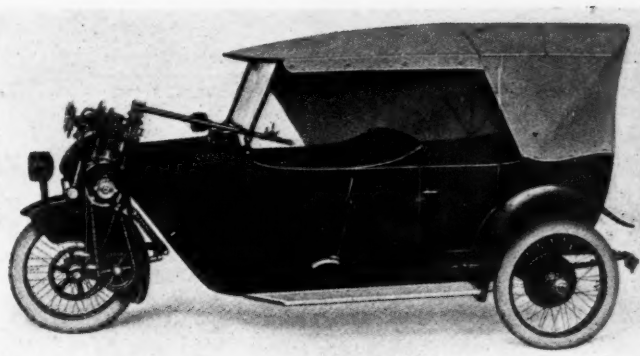
Clincher tires are used exclusively and are generally mounted on detachable rims.

There are no metal disk wheels, and although detachable wire wheels can be supplied, they never form a part of the standard equipment.

Removable cast steel wheels of the spoke variety have made their appearance and doubtless will be used very extensively in the future.

The only really important case of an overhead valve engine is a Mercedes which was in production before the war, and is being continued with the addition of a cover over the valve mechanism. This is a high-class job with overhead camshaft and is very similar in its general design to the aviation engines Mercedes produced during the war. The vacuum feed system is not yet employed in Germany, and possibly will not be adopted to any great extent, the preference apparently being for gravity feed for small cars and for air or exhaust pressure with the tank at the rear for medium and large cars.

The outstanding feature of German construction at the present time is to be found in the body lines. Every manufacturer appears to have decided on one particular type of touring body which is so distinctly Teutonic that it might be imagined there had been concerted action to advertise the origin of the car wherever it went. In whatever country of the world it were found, even the most uninitiated would recognize the modern German automobile as a product of the Fatherland.



Phanomobil 3-wheeler

The radiator is generally pointed, the sides of the hood are straight and the top rounded, the windscreen is hinged at the bottom, the body has high, flared sides, or with a much greater width at the top than at the bottom, and the top is invariably concealed in the body.

Frequently the rear of the car is brought to a point and has a certain resemblance to the bow of a yacht.

This type of body, built rather narrow on the chassis line, necessitates placing the brake lever, and frequently the change speed lever, on the outside, a practice which does not appear to be distasteful to German motorists.

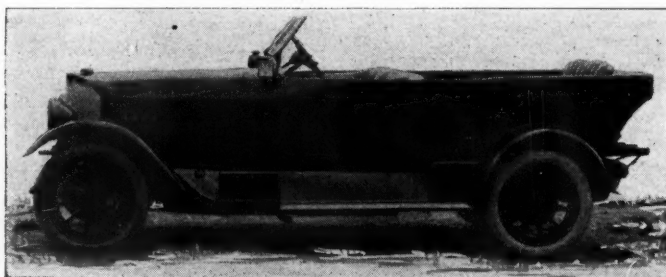
Very frequently the body is painted in two colors, a light color being used for the sides, up to the point where the hood begins to round off, and a dark color for everything above this line. This provides a straight line from radiator to rear, and gives to the car a somewhat nautical appearance, particularly if there is a deck just back of the front seats and if the stern is brought to a point.

While the general lines may not meet with the taste of motorists all over the world, there is no doubt that the German practice of building a housing for the hood in the body is excellent. In practically all European countries 75 per cent of the driving is done with the hood down, and the German method of dropping it into a recess where it is completely hidden and protected is preferable to the more common practice elsewhere of hiding it with a slip cover.

There are two distinct types of housing for the top. In one a well is formed and the top of this is covered either with a hinged wood panel or with a leather cover permanently attached along one edge and secured with push buttons along the other edge. The disadvantage of this is that if water gets in the well it cannot be got out again very easily.

With another design a ledge is formed to receive the top, and the whole is hidden by a leather housing composed of a horizontal and a vertical surface, which forms a continuous line with the rest of the body. In this case water can get away readily and if the cover is left off the top has a chance to dry. With the German color scheme comprising a black or dark band from front to rear, the leather cover merges in with rest of body.

Having been seriously handicapped by the shortage of leather during the war, Germany has developed artificial



Mercedes touring car

leathers and is using these even on high-grade cars with very good effect. Very many of the fancy leathers prove on examination to be only imitations. The upholstery, with its sharp angles and its divisions between seats, looks hard and harsh. Even in the case of big cars it is customary to divide the rear seat into two places and to accommodate the fifth and sixth passengers on folding seats.

Germany is not paying attention to the really cheap car as it is known in America. The buying ability of the people is low and the home market is too small to allow her to get into production on a really big basis, and she does not seem to entertain any hope of competing with America on the foreign field in the cheap car class.

The cheapest class car she will build will be 4, 5 or 6-passenger model with four cylinders of about 70 mm. bore. This will meet the home requirements, where maintenance costs figure very prominently and will also be saleable on many of the foreign markets.

The greatest export business, however, will be done with a four or a six-cylinder model of nominally 18 hp. Cars of this type are already being shipped to the Scandinavian countries, and undoubtedly an important effort will be made to get on the South American markets.

Competition will not be in the cheap car class, but in the medium and high class field. Germany at the present time is not really dangerous, for she is laboring under considerable difficulties.

There is no doubt, however, that she will come back strongly, and that within two or three years' time she will have to be seriously reckoned with on the world's automobile market. Manufacturers realize that for the present trade with France will be difficult and that with England, America and Belgium will be limited. In the Scandinavian countries, in Spain and Portugal, there is no prejudice against German automobiles. The South American market has to be recaptured and the Far East is being looked upon as an outlet.

During the war Germany had no need of developing the use of army automobiles on the same scale as the Allies. With no tires and very little gasoline, the railroad had to be used in preference to the high road for the transportation of supplies and troops, and only the highest officers were given passenger cars. Under the peace conditions large quantities of automobile trucks had to be handed over to the Allies.

During the period of the great retreat and the revolution the utmost

disorder prevailed. While the typewriter girls took their machines home with them, and soldiers appropriated their arms and pilfered stores, officers took possession of army automobiles and sold them to unscrupulous dealers. Later the Government stepped in and put up for sale what remained of the army automobiles, so that Germany never had to face the disposal of big stocks such as were found in France and England.

Practically all the German automobiles got into the hands of dealers, who rebuilt them, fitted them with tires, which were drained from France and England, built new bodies and sold them in the Scandinavian countries. Many of these cars could be passed off as new, and prices for a time ran as high as 240,000 marks for an open touring car.

Among the sales were a certain number of French, English or American captured vehicles, which were also put into shape and sold. Frequently the owners of these are unable to get spare parts, for on account of the doubtful origin of the vehicles, the authorized dealers refuse to supply. This period, which lasted for 18 months after the armistice, was a wonderful harvest for the dealers in Germany and surrounding countries.

The mark stood exceedingly low, army cars could be bought very cheaply, and the Scandinavian countries, having been starved of automobiles for four years, made ready purchases. The bottom has now dropped out of this business, to the great regret of those who were in the deal.

Enormous capital increases have been made by all the German automobile companies. This has been made use of in many of the Allied countries in order to prove that Germany is preparing to become a serious contestant on the world's market. Much of this increase is due to the depreciation of the mark and the enormously increased cost of raw materials. Labor, too, is very much more costly than before the war.

Whereas in 1914 a skilled worker rarely earned one mark an hour, wages now vary from four marks in Bavaria to 6 or 7 marks in Stuttgart and Mannheim. There are in Germany about 100 automobile manufacturers, but only 20 of these are of real importance, the others either assembling a car on a small scale or running an automobile factory as a section of bigger works.

It is estimated that the aggregate capital invested in the German automobile industry is 400 million marks, as compared with 120 to 150 millions in 1914. The maximum output of the factories may be estimated at 30,000 automobiles of all kinds per annum.



Horch 5-ton truck with trailer. The use of trailers is common in Germany. The enclosed driver's cab and cast steel wheels are distinctive features

Novelties Are Prominent at the Automobile Salon

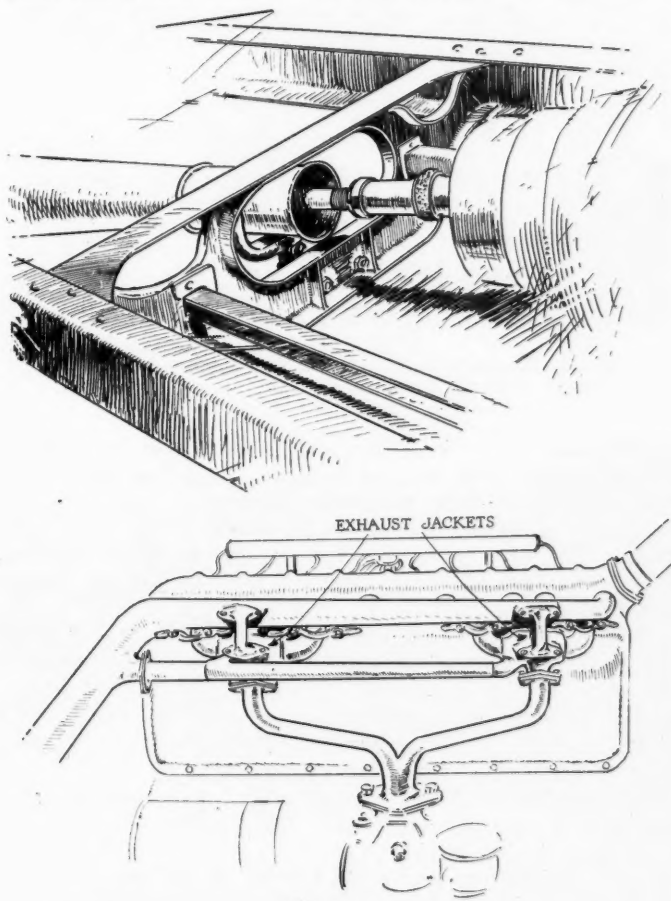
Twenty cars were shown at the Salon this year, equally divided between foreign and domestic products. Much interest was aroused by the new coachwork exhibited by the custom builders. The Minerva, shown for first time since 1913, has new features. Duesenberg only new car.

THE Automobile Salon, which started as an exhibition of imported cars and, during the war, when the importation of automobiles was practically at a standstill, assumed the character of a show of high grade domestic cars and coachwork with a light sprinkling of foreign products, appears now to be in a good way to become definitely an international show of quality automobiles rather than a show of foreign cars only. Out of twenty cars shown at the Hotel Commodore this year, ten are American and ten foreign, with the prospect of one more American car being added in the course of the week. Custom built automobile bodies (on chassis) are being exhibited by nine firms, all American.

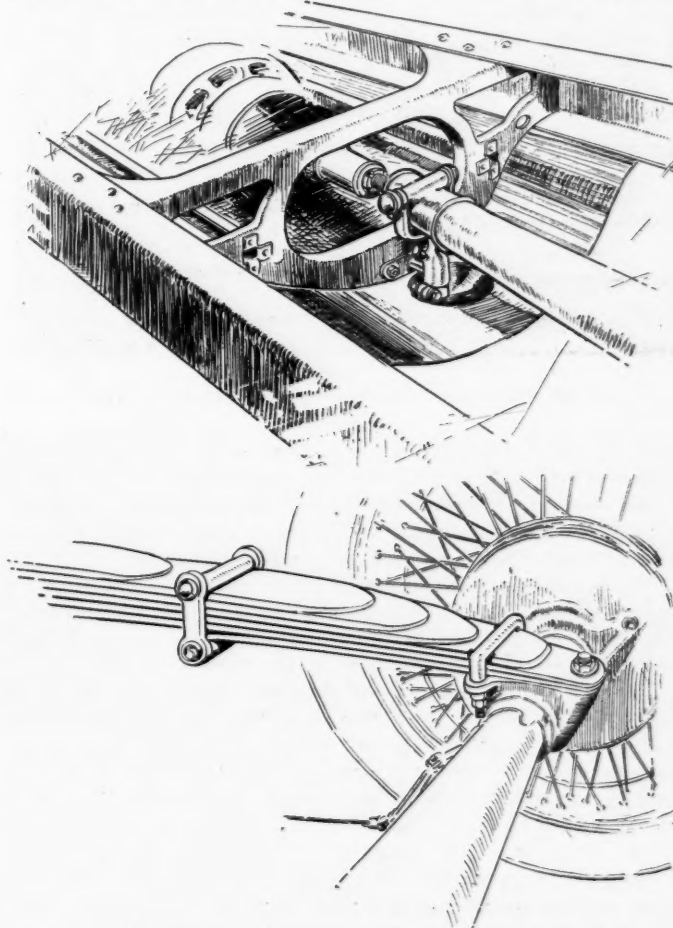
Of the ten American makes on view at the opening, only one, the Duesenberg, is entirely new, and this is fully described elsewhere in this issue. Another new American make, the Collins, was scheduled in the list of

exhibitors, but the car had not yet arrived at the time of the writer's visit to the Show.

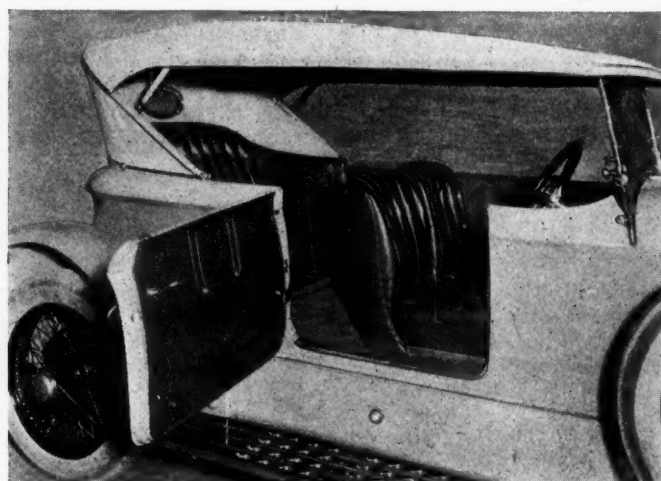
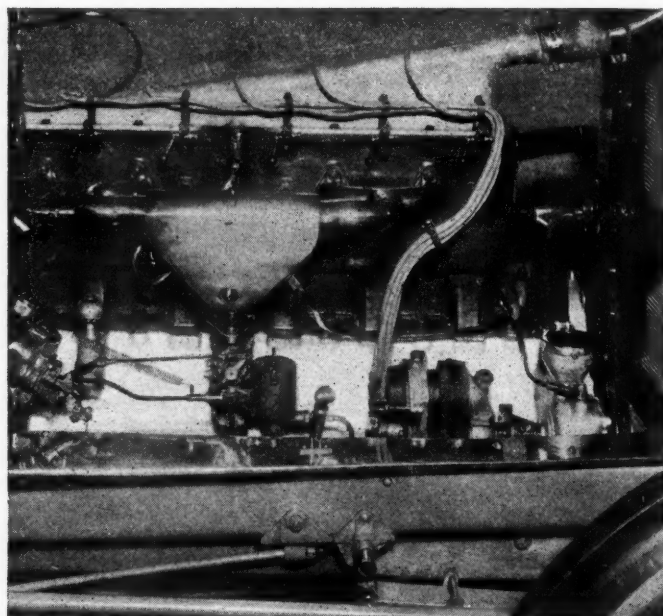
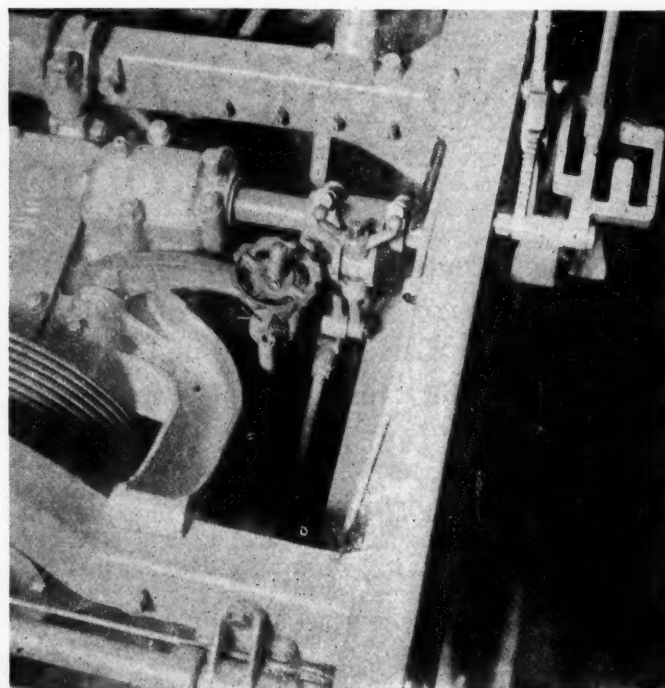
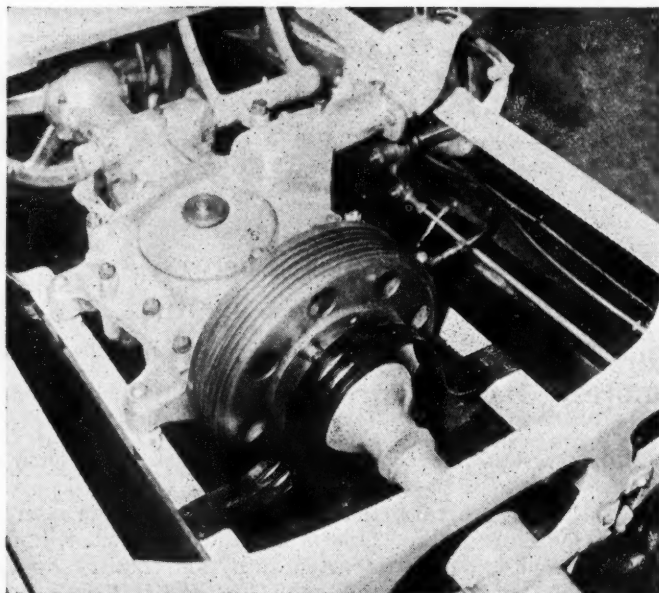
Of the foreign cars, the Minerva has not been seen at the Salon since 1913. This is a car with a four-cylinder engine, and is to be imported into this country by the Brooks-Ostruk Co., New York. The engine has a bore of 90 and a stroke of 140 mm., and the cylinders are now cast in block, with all of the cylinder heads in a single casting instead of separate. The new Minerva is equipped with the S. E. V. starting and lighting system. The radiator design has been changed, and one of the objects in view in adopting the block construction of engine was to insure that the cooling water temperature will be more uniform throughout the jacket. As customary in Continental cars, the transmission gear is mounted separately, and the top half of the aluminum case is removable, thus permitting of replacing any bearing in the case in four



Above—Torque tube frame crossmember on the Minerva. Below—Details of exhaust manifolds on Duesenberg engine



Above—Forward support of torque tube on the Minerva. Below—Minerva spring



Above—Minerva transmission. Below—Sunbeam engine

Above—Sunbeam brake adjusting means. Below—Brooks-Ostruk body on Delage chassis, showing runningboard

hours' time. There is a very deep cross member at the middle of the frame, the lower edge of which conforms to the shape of the mudpan. This cross member is pressed with an opening through which the propeller shaft passes. The propeller shaft is inclosed in a tube, in which it has a certain amount of freedom, there being no bearing on the propeller shaft at the forward end of the torque tube. The tube is supported at its forward end by a forked link, pivoted to the lower part of the frame cross member.

There are also some novel features in the rear spring construction, which is of the cantilever type. The main leaf or master leaf of the spring is only about one-fourth as long as the complete spring, and together with the second and third leaves is secured underneath the rear axle housing by means of suitable spring pads.

The Sunbeam car is exhibited practically in the same form as it was shown at Olympia last winter. Rudge-Whitworth wire wheels are now standard equipment. The Sunbeam employs a two jet carbureter, each jet supplying the three cylinders of one block. In this way a better distribution is claimed to be obtained. One feature of

considerable interest on this car is the brake adjustment for both the transmission and the wheel brakes. One brake is adjusted by means of a finger wheel, and the other by means of a horizontal bar with knobs at the ends. The two adjusting devices are located close together, underneath a trap-door in the foot-board. Both are self-locking.

There have been only minor changes in the Daniels eight, including an increase in the size of the radiator, which is of the honeycomb type, and the use of a different form of suspension for the rear fuel tank. The capacity of this tank was somewhat increased, which called for a more secure method of suspension.

The features of the Daniels stand is a new marine roadster, a four-passenger car. This is provided with an aluminum body, having a mahogany deck running all around. The front seats are divided, and there is plenty of leg room in the rear. The lights are carried out in imitation of ship's funnels, and there are two ventilators on the sides of the cowl and one on top. Upholstery is

(Continued on page 1033)

Duesenberg Car Has "Straight Eight" Engine and Four Wheel Brakes

In the powerplant of this interesting new vehicle many of the Duesenberg racing features have been adapted to passenger car practice. Hydraulic system of actuation of brakes replaces the Perrot, which has been a feature of all French systems. Unsprung weight reduced.

By P. M. Heldt

ONE of the interesting new cars exhibited at the Salon this week is the Duesenberg "straight eight," which has been developed by the Duesenberg brothers and in which a four wheel braking system is featured. Fred Duesenberg, with his engineering staff, has been working on the design of this car practically since the signing of the Armistice. Many of the features are similar to those of the post-war Duesenberg racing machines, notably the use of an eight cylinder-in-line engine. The successes achieved by these racing machines the past year are well known to our readers.

In the design of the new chassis, it has been Duesenberg's aim to produce a car that should embody the most up-to-date features in automobile engineering; a car that, while having all the liveliness and speed that the fastidious owner demands, would yet be economical to operate. Fuel economy has been achieved by the use of an engine of moderate cylinder displacement (260 cu. in.) and capable of running at very high speed, and tire economy by the use of cord tires of liberal size and the reduction of all unsprung weight to a minimum to eliminate bouncing of the wheels and consequent slipping and wear of the tires.

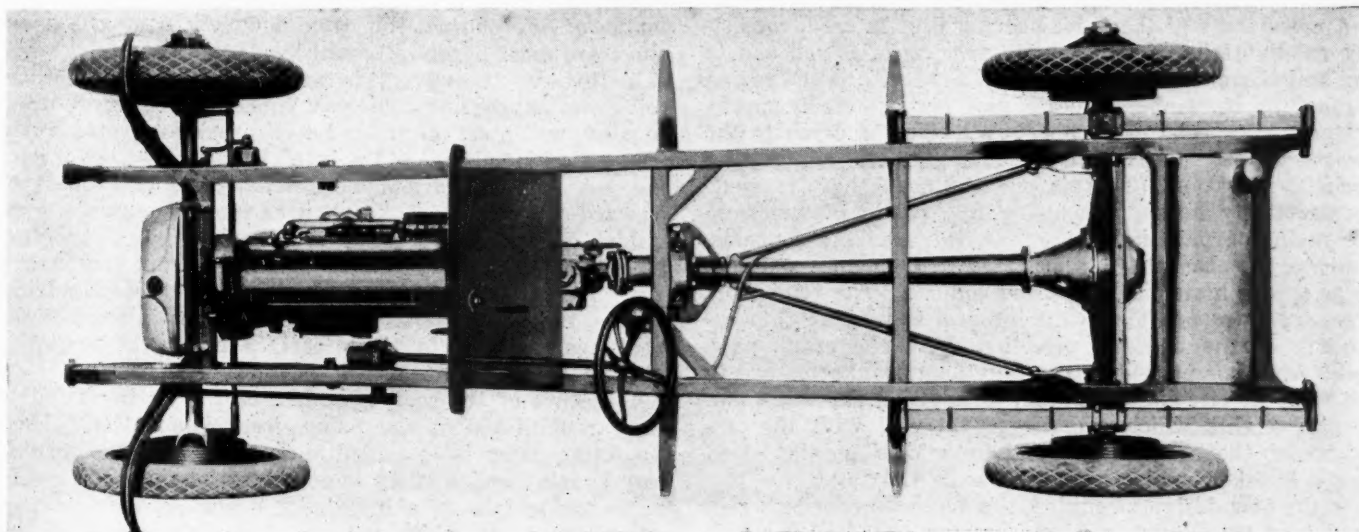
The engine has a bore of $2\frac{7}{8}$ in. and a stroke of 5 in. All eight cylinders and the top part of the crankcase are cast in a single block, the cylinder head being a separate iron casting and the lower half of the crankcase an aluminum casting. In the engine shown at the Salon, the well-known Duesenberg arrangement of valves is used, the inlet and exhaust valve being arranged in the cylinder head horizontally and operated by means of rocker levers

extending up the sides of the cylinders. However, owing to the very satisfactory results obtained with the racing engines which have inclined valves in the head, operated from an overhead camshaft, it has been decided to adopt this construction, and this feature will be introduced in the next lot of engines to be built. This change in the design also will make it possible to completely machine the compression chambers, the advantage of which is that it permits of making all eight compression chambers of exactly equal volume, which tends to promote smooth running, and to prevent the adherence of carbon deposits to the combustion chamber walls. While in the racing engine two exhaust valves and one inlet valve are used per cylinder, the passenger car engine will have only a single inlet and a single exhaust valve.

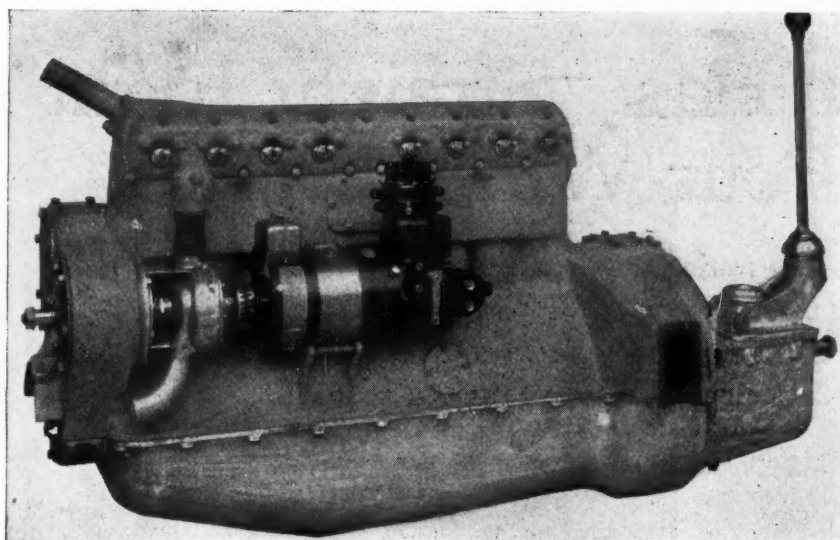
The exhaust valves are made of cobalt-chrome steel, and the inlet valves of low percentage tungsten steel. Double springs are used on both sets of valves, as has become customary for high speed overhead valve engines. The compression chambers are so designed as to give a full load compression of 80 lb. per sq. in.

Most of the racing successes of Duesenberg cars have been achieved with the aid of magnalite pistons, and Duesenberg still favors aluminum alloy pistons, but in view of a certain amount of prejudice against them, due to the fact that some prominent manufacturers have given up their use, he will furnish either aluminum or cast iron pistons, as desired by the customer.

Piston and connecting rod are held as light as possible, in order to reduce the inertia forces and the stresses re-



Chassis of Duesenberg car



Unit powerplant of Duesenberg, from generator side

sulting therefrom. The pistons are of thin walled design, and the piston head is connected to the skirt by means of four radial ribs, which serve both to support the piston head and to help transmit the heat absorbed by the head to the skirt. Each piston carries only two compression rings, in grooves above the piston bosses, it having been found that two rings, when well fitted, insure substantially as good a compression as three, and, of course, they save considerable weight. There is a circumferential oil groove cut into the skirt of the piston over the end of the piston bosses. The combined weight of a piston, piston pin, rings, connecting rod cap and bolts is between 32 and 34 oz.

The piston pin has its bearings in the piston bosses, and is clamped in the upper end of the connecting rod by means of a clamping screw which passes through a shallow groove on the piston pin, which prevents it from drifting. The connecting rods are made of chrome nickel steel (the same material as was used for the rods of the Liberty aircraft engine) and are of the tubular type. The caps are held on by two cap screws with castellated nuts and cotter pins. The crankpin bearing bushings are soldered into the connecting rod head and cap, in order to obtain the best possible heat conductivity between bushing and rod. To promote the dispersal of heat from the outside of the connecting rod big end, the latter is turned with cooling flanges or ribs.

A crankshaft of the three-bearing type is used, consisting substantially of two four-throw cranks joined end to end and at right angles. While not as speedy as the racing engine, the Duesenberg stock engine is of decidedly speedy design, and special care therefore had to be given to the design of the crankshaft with a view to eliminating periodic vibration. To this end the crankshaft is made comparatively heavy, measuring $2\frac{3}{8}$ in. in diameter on the main journals and $2\frac{1}{8}$ in. on the crankpin journals. Besides, the crankshaft is provided with balance weights, so as to eliminate all unbalanced couples. The four short crankarms are provided with integral counterweights extending in the opposite direction from the crank axis, while what correspond to the four long crankarms are in the form of circular disks, and in addition there are two counterweights which are forged integral with the two halves of the crankshaft at their middle points. End thrust is taken up on the central main bearing.

In the new design of engine, the overhead camshaft will be driven through a vertical shaft at the forward end, with helical gears at top and bottom, the vertical shaft

running at crankshaft speed. This construction is similar to that employed in the racing engine, except that the latter has straight bevel gears and that both members of the upper set of bevel gears will be mounted in the cylinder head, instead of the driven member in the head and the driving member in the valve gear drive housing. Thus, when the cylinder head is removed, the two upper bevel gears come right with it, the driving gear slipping over the top end of the vertical shaft, which has one flat on it. This makes it impossible, in taking the engine apart and reassembling it, to get the valve drive together wrong.

As already stated, the entire valve drive at the front end of the engine is encased in an aluminum housing. A drive for the generator is taken off from the vertical shaft at about mid-height by means of a pair of helical gears, and a drive for the combined water pump and oil pump

is taken off the crankshaft pinion by means of an extra bevel gear, mounted on a horizontal shaft.

Lubrication of the engine is entirely by the pressure system, the gear type of oil pump being located at the forward end of the engine, as just explained. The oil is forced through a passage machined in the housing of the pump into a main distributor pipe extending the length of the crankcase, and through radial passages from same to the three main bearings. At the main bearings the oil passes into the drilled crankshaft, and so reaches the crankpin bearings. Each of the four crank disks is turned with an oil groove on its circumference, which is closed by means of a steel ring pressed over it, an oil-tight joint being secured by tinning. These oil grooves are always full of oil, owing to the centrifugal force, and this obviates trouble from unequal lubrication of the different crankpin bearings.

The entire electric system, including the ignition unit, the generator and the starter, is of Delco make. In the racing job the distributor was driven by a pair of helical gears off the center of the camshaft. On the new design the distributor will be mounted on the generator, the same as on present design. There is a bracket mounting for the generator at the side of the engine, which is driven from the camshaft drive at the forward end, as already described, and the starter is mounted on the flywheel housing in the usual manner. With the ignition unit at the center of the engine, the cable connections to the spark plugs are most nearly of equal length.

A three-point support is used for the engine, there being two supporting arms cast integral with the flywheel housing, which set on pressed steel brackets riveted to the frame side members, and a third support at the forward end. A semi-cylindrical, ribbed flange is cast onto the forward end of the crankcase, with which engages, on the inside, a similar flange of a pressed steel supporting bracket, which rests on top of the frame front cross member. A couple of bolts unite the two semi-cylindrical flanges, these passing through oblong holes in the pressed steel member so as to give a certain amount of flexibility to the support.

A feature of the cooling system of the engine fitted to the car exhibited at the Salon deserves mention. Here the water pump is located directly back of the camshaft gear housing and a short hose connection joins its outlet to the water inlet of the cylinder head. The water here enters a passage which extends the whole length of the engine underneath the exhaust valves, and at the rear

end of the engine the water enters the main jacket space. Thus the chief cooling effect is produced where the greatest amount of heat is absorbed by the metal.

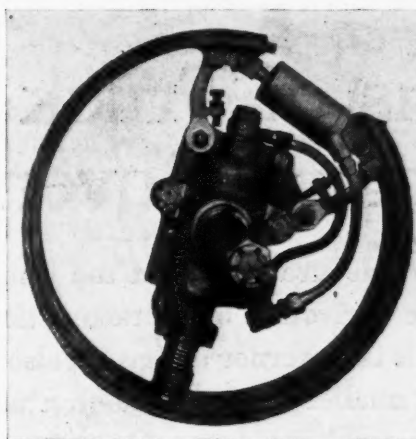
Engine, clutch and change speed gear are combined into a unit powerplant. The change gear is of the selective sliding type with three forward speeds and reverse, and is fitted with a centrally located ball handled control lever. The propeller shaft is of the enclosed type, its tube being connected to a cross member of the frame by means of a forked joint, taking up both driving thrust and torque reaction.

A double flexible disk universal joint is incorporated between the tail shaft of the transmission and the propeller shaft. Each of the two joints comprises two $7\frac{1}{2}$ -in. disks, and the two joints are about 7 in. apart. By the use of these two universal joints, a short distance apart, not only are variations in the angular relation of the transmission tail shaft and the propeller shaft allowed for, but any want of alignment of the two (failure of the axles to intersect) is taken care of.

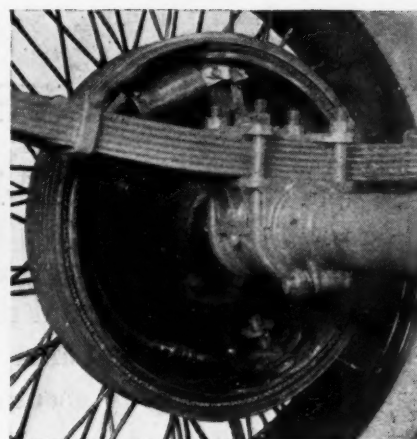
The propeller shaft is made hollow to obviate any possibility of whirling, and is enclosed in a trumpet-shaped housing, bolted to the gear carrier of the rear axle. The rear axle construction is strengthened by diagonal brace rods extending from the forward end of the "third member" to the spring shackles on the axle housing.

Spiral bevel gear drive is employed, and the rear axle is of the type having a pressed steel welded housing with Magnalite gear carrier, and an aluminum cover plate. The bevel pinion shaft is supported in one Hyatt roller bearing directly behind the pinion, and one radial ball bearing some distance forward. With the exception of the Hyatt bearing referred to, all bearings in the rear axle are of the radial ball type.

In the design of the axle, every endeavor was made to cut out all unnecessary weight so as to get the lightest possible unsprung parts consistent with the strength necessary for safety. Thus the axle shafts are made of chrome nickel steel, and drilled out by means of a gun



Front wheel brake from outside



Rear wheel brake from inside

drill. The outside diameter of these shafts near the hub is $1\frac{31}{32}$ in. and near the differential $1\frac{7}{16}$ in., while the drill hole through them is $\frac{7}{8}$ in. in diameter. The serrated hub on which the wire wheels are mounted are forged right on to the axle shaft, thus eliminating considerable machine work, obviating risks from joints, and saving weight. The rear brake drums are secured directly to the axle shafts, without intermediary parts, which is the best way of insuring continued alignment with the shafts.

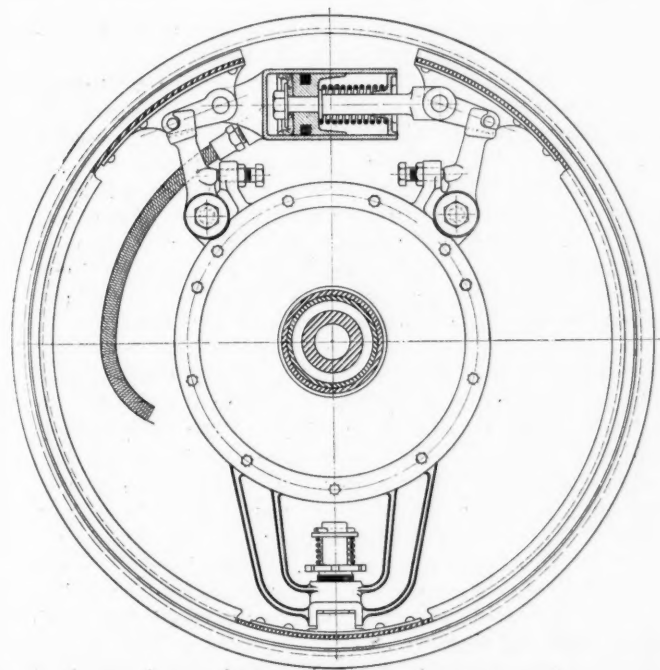
In the design of the front axle Duesenberg has reverted to the tubular type, his reason for this being that the front axle must sustain the brake reaction of the front brakes, and a tubular section has greater torsional strength than an I section containing an equal amount of material. The tube is of chrome nickel steel, and has a wall thickness of $\frac{1}{8}$ in. The steering knuckles and axle ends are drop forgings and are of somewhat unusual design, partly because the main member of the axle is tubular and partly because provision has to be made for supporting the brakes and conveying the oil to the brake cylinder endowed with a dual motion.

The frame is light yet strong, both side and cross members being made of $\frac{1}{8}$ in. chrome nickel stock. The side members have a depth over the middle portion of $6\frac{7}{16}$ in. and taper toward the ends. In the model now under development, the flanges of the frame side members will be widened where the cross members come, so as to allow for the metal taken away by the rivet holes at these points. There is one very deep and thoroughly brazed cross member at the middle of the frame, to which the forward end of the propeller shaft housing connects. Then there are a front cross member (which carries both the forward part of the engine and the radiator), one cross member at the forward end of the rear spring, two cross members almost directly over the rear axle, and one cross member at the rear end of the frame. The side members are absolutely straight, which in connection with the very substantial cross bracing insures a frame of great rigidity.

Springing is by half-elliptic springs all around, the rear pair being 59 in. and the front pair $39\frac{1}{2}$ in. long. Lubrication of the spring bolts and all other chassis parts is the Alemite high pressure system. The fuel tank, which is of the pressed steel, welded type, is located at the rear of the chassis, and fuel feed is by the vacuum system.

One of the outstanding features of the chassis is the four wheel service braking systems. In our descriptions of government French cars with four wheel brakes, it probably has been noticed that a single actuating mechanism system, known as the Perrot, is used almost exclusively. This is un-

(Continued on page 1031)



Hydraulically operated rear wheel brake

An Analysis of Truck and Tractor Engine Governors

In the following article are discussed the functions of a governor, the types in use, and the derivation of characteristic curves for each type. The application of analysis in governor design is also treated, giving changes necessary to secure smaller static fluctuation and lower stability value.

By Fred C. Ziesenheim, Mem. S. A. E.

ALL tractor engines with one exception and nearly all high grade motor truck engines are fitted with governors for limiting the speed of the engine and for automatically adapting the output of the engine to the demand put upon it. A governor is needed on tractors for both plowing and belt work, as the loads on the engine are never steady. A man operating a tractor is not able to keep the engine from speeding up and running too fast when the load is light, nor is he able to keep the engine from stalling or stopping when a heavy load is suddenly put on. Running an engine with no load or a light load at a higher speed than the engine was designed for is much more severe than trying to carry an overload. In most high speed engines, the bearing loads resulting from explosion pressures are greatly exceeded by those resulting from centrifugal and reciprocating forces, which increase as the square of the speed. Obviously, an engine fitted with a governor is more reliable and will last longer than one not so equipped.

A governor is obviously needed on truck engines to prevent overspeeding and consequent injury to both the truck and the engine.

A governor has two things to do:

- (1) It must measure the speed of the engine.

- (2) It must vary the amount of fuel supplied the engine so that the engine will run at the speed desired.

When the engine is running at the desired speed, the governor produces a centrifugal or other force which is balanced by springs; any change from the desired speed puts the arrangement out of balance; when the unbalanced force is strong enough to move the governor parts, the governor will act to adjust the speed by moving the throttle, changing the amount of fuel going into the engine. From this we note that, when the engine is running at the desired speed, the speed must vary by a certain amount before the governor will act or move to correct it. The amount that the speed has to change depends on how the governor is made. If a centrifugal governor could be made that had no friction, that would move instantly without any loss of effort or force, it would keep the engine running at exactly the same speed all the time, but since this is impossible, friction will always keep the governor parts from moving freely. As a change of speed is necessary before the governor can act, and as friction will prevent the governor from going back to its first position, the light and no load speeds will always be greater than the full load speeds, with a simple centrifugal governor.

A sensitive governor is one that requires only a small speed change to cause it to act. The degree of sensitivity expressed as "Static Fluctuation" is the difference of the no load and full load speeds, divided by their average. An engine with a no load speed of 1062 r.p.m. and a full load speed of 1000, which gives a difference of 62 and an average of 1031 r.p.m., has a static fluctuation of 6 per cent. A static fluctuation of 6 to 10 per cent is considered satisfactory for truck and tractor service. No comparative data is available giving the static fluctuation of various engines and governors. The tractor tests conducted by the Ohio State University at Columbus, Jan. 26 to 30, 1920, give the speed variations of various tractors at one-quarter, one-half, and full load as a percentage of their speed at three-quarter rated load. Some of these values are shown in Fig. 1. The wide range of speed variations obtained from many of the tractors indicates that opportunity exists for considerable improvement in regulation. A static fluctuation of less than 5 per cent for low and medium speed engines is not warranted by the service required. It would entail the use of too delicate a governing mechanism, and would not admit of economical manufacture, nor would it be reliable under continued service.

A governor characteristic other than static fluctuation which has considerable to do with regulation is "travers-

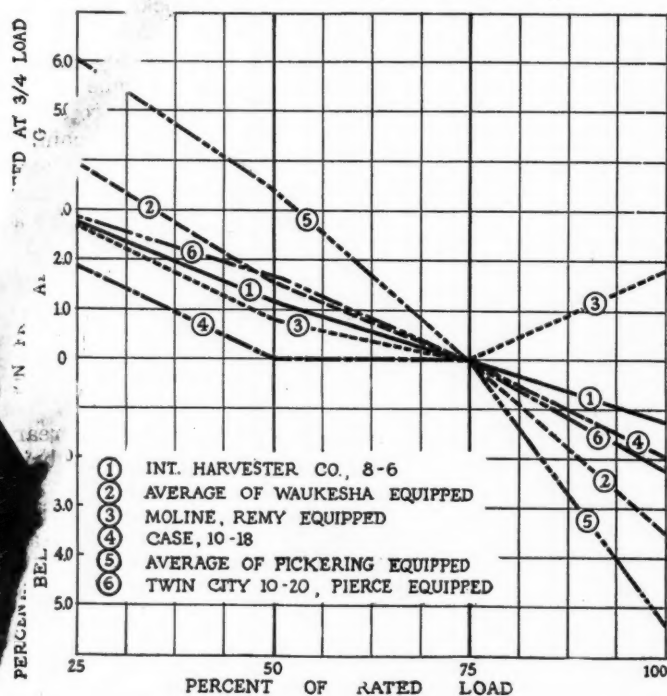


Fig. 1

ing time." It is the time which elapses from the occurrence of a speed change, until the governor has corrected that condition, and is a measure of the promptness of governing. Since it is usually only a fraction of a second, it does not admit of easy measurement.

The governor used on truck and tractor engines is usually of the centrifugal or flyball type, driven by gearing from the engine crankshaft (see Fig. 2). It consists of a governor shaft with a carrier which carries two weights or flyballs that are free to swing from the shaft on pins. When the shaft is revolved rapidly the weights will be swung out by centrifugal force. As soon as the engine is started, the weights try to swing out as far as they can go, but they are prevented by springs which tend to hold the weights in. As the engine speeds up the centrifugal force of the weights increases, exerting a greater force on the springs. As the weights move out they push a sliding sleeve along the governor shaft, the sleeve presses against a shoe or button attached to the governor lever and makes the lever turn on its shaft. A rod attached to the other end of the governor lever is also fastened to the throttle valve. The governor lever in turning starts to close the throttle valve in the carbureter, thus shutting off the supply of the fuel and air mixture to the engine. The weights and springs must be selected and adjusted so that the governor will give the engine speed desired.

An analysis of the forces acting within and upon a governor may aid in forming a conception of the variables affecting governor design. The data necessary for an analysis of a particular governor will consist of the following:

1. Principal dimensions of the governor parts and governing system.
2. Weight of all parts in the governing system which affect governor operation.
3. Center of gravity of the governor balls.
4. Tension of the governor springs throughout the governor's range.
5. Position of the center of gravity of the governor balls and the corresponding speed throughout the governor's possible range of action.
6. Throttle opening at full load speed and at the desired no load speed.

Item 5 may be obtained by suitably driving the governor through its speed range, noting the position of the sliding element or throttle actuating device, for each speed. The corresponding location of the center of gravity can be obtained from a layout. If readings are taken with constant speed increments, then with constant speed decrements, two distinct curves will be obtained showing the influence of solid friction (see Fig. 3). A mean of the two curves would be used for computing the characteristic curves, since it represents the equilibrium speed of the governor when running free from solid friction.

Item 6 can be secured by suitable engine runs, recording throttle opening at the full load speed and at the desired no load speed. A layout of the control system will indicate the governor movement necessary for each speed and load condition.

Derivation of Centrifugal Governor Characteristic Curves

Forces—

The forces existing in a centrifugal governor are,

W = sum of weights of governor balls, pounds.

S = tension of governor spring, pounds.

Q = sum of weights and forces other than spring tension which resist governor action, pounds.

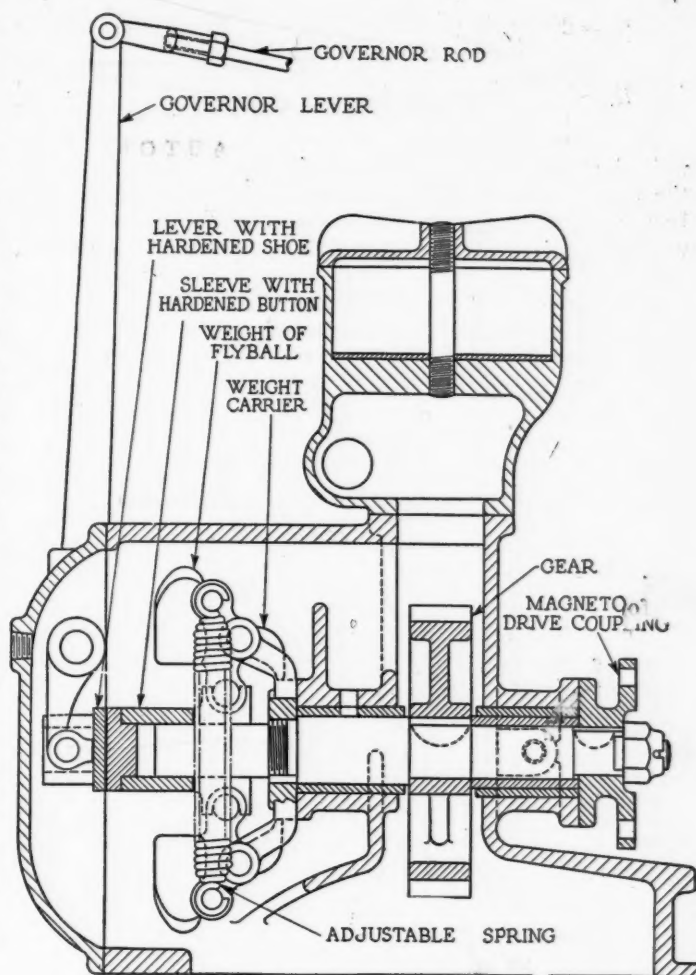


Fig. 2

Moments—

The moments of all the forces existing in a centrifugal governor are considered as acting at the fulcrum of the governor ball, through the center of gravity of the governor ball, perpendicular to the governor axis.

C_f = centrifugal force of the governor balls at their center of gravity, pounds.

C_w = moment of centripetal force of governor balls weight, pound-inches.

C_s = moment of centripetal force of spring tension, pound-inches.

C_q = moment of centripetal force of resistances other than spring tension, pound-inches.

Summation of Moments—

For a state of equilibrium, the summation of forces and moments about and through the location mentioned, must equal zero. The positive force tending to produce governor action is the centrifugal force of the governor ball. The negative force or reaction is the sum of the centripetal forces which, at any particular instant, must equal the centrifugal force for a state of equilibrium.

Computation of Moments—

Referring to Fig. 4, let

L_1 = distance, fulcrum to center of gravity of governor ball, parallel to the governor axis, inches.

L_2 = distance, fulcrum to center of gravity of ball, perpendicular to the governor axis, inches.

L_1 = distance, fulcrum to point of spring application, parallel to governor axis, inches.

L_2 = distance, fulcrum to point of spring application, perpendicular to governor axis, inches.

The value and direction of moments resulting from the weight of governor parts depends entirely upon whether the center line of the governor is horizontal or vertical. In a vertical governor, the moment of the governor ball weight C_w is plotted for various positions through the

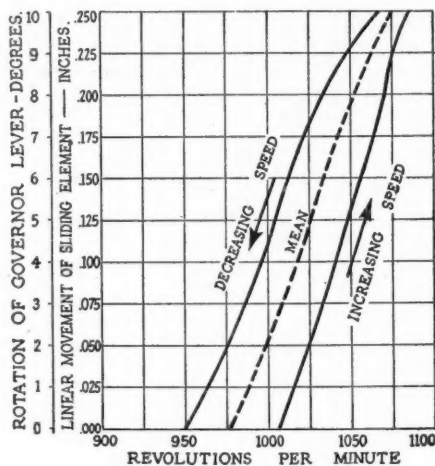


Fig. 3

range of governor ball movement, being computed as follows:

$$C_w \times L_1 = W \times L_2$$

$$C_w = \frac{W \times L_2}{L_1}$$

If the governor is in a horizontal position, when the ball is above the axis the moment of its weight will be opposed to centrifugal force, and its moment is therefore a centripetal one; whereas when the ball is below the axis, its weight moment is in the same direction as centrifugal force, and therefore it is a centrifugal moment. Since there are usually two governor balls placed 180 deg. apart, their weight moments will cancel each other and need not be considered.

The centripetal moment of the spring force is plotted for the various positions from—

$$C_s \times L_1 = S \times L_2$$

$$C_s = \frac{S \times L_2}{L_1}$$

The resisting forces Q , are composed of—

1. The weight of those parts which move when the governor ball is moved through its range, whose moment can be resolved into a resisting or centripetal moment. The weights may be that of sliding collars, counterpoise, levers, etc. Their moments are considered as acting at the center of application of the spring force; their value depends on whether the governor axis is vertical or horizontal. For a vertical governor, the moment is computed as follows—

$$C_q \times L_1 = Q \times L_2$$

$$C_q = \frac{Q \times L_2}{L_1}$$

For a horizontal governor, the moment of the weights which can be resolved into centripetal moments, would be—

$$C_q \times L_1 = Q \times L_2$$

$$C_q = \frac{Q \times L_2}{L_1}$$

2. The resisting forces incident to or generated by the governor itself, as frictional resistance, forces resulting from lack of balance of rotating parts, and forces other than spring tension which can be resolved into resisting moments.

3. The weight of parts other than those of the governor itself, whose moment can be resolved into a resisting moment, such as valve gear, levers, etc.

4. Resisting forces other than those of the governor itself which may be imposed upon it, as valve gear friction, forces caused by an unbalanced throttle valve, throttle valve springs, etc.

5. The moments of the resisting forces and weights which are known are computed and plotted as acting through the center of gravity of the governor ball about the ball fulcrum, in accordance with the manner outlined.

The centrifugal force of the governor balls acting through their center of gravity, perpendicular to the governor axis, is—

$$C_f = 0.00034 W R N^2$$

where

W = weight of governor balls, pounds.

R = radius of center of gravity of governor balls, feet.

N = revolutions per minute of governor balls.

The values of R and N are obtained from Item 5, "Position of the balls center of gravity and the corresponding speed"; or from the mean curve of Fig. 3. After plotting the centrifugal force curve C_f for various values of R and N , a curve is plotted which represents the sum of the known centripetal moments, C_w , C_s , C_q , etc. Subtracting the values of the summation of centripetal moments from the C_f curve, gives the values of C_g which could not be analyzed and computed. Constructing a curve of the C_g values thus obtained, gives the frictional characteristic curve of the particular governor, which values can be used in the design of similar governors.

Analysis of Governor Characteristic Curves

An analysis of the characteristic curves of centrifugal governors such as shown in Fig. 4 can be made on the following points:

Static Fluctuation—By definition, static fluctuation is a measure of the closeness of speed regulation, since it is the difference of the no load and full load speeds, divided by their average.

Where—

p = static fluctuation.

U_u = no load speed, revolutions per minute.

U_d = full load speed, revolutions per minute.

$$p = \frac{U_u - U_d}{\frac{1}{2} (U_u + U_d)}$$

A governor with a small static fluctuation is spoken of as being a sensitive governor, hence the sensitiveness of governing is closely related to the value $1/p$.

Referring to the C_f curve of Fig. 4, when the no load and full load speeds differ by only a few per cent, it is permissible to state that the static fluctuation is the difference of the tangents of the angles I_u and I_d , divided by twice the tangent I_u . The angle I_u is formed by a line from the origin at the axis of the governor, to the upper portion of the C_f curve that is being considered. The angle I_d is formed by a line from the origin to the lower portion of the C_f curve that is being considered. The static fluctuation then becomes

$$p = \frac{\tan I_u - \tan I_d}{2 (\tan I_u)}$$

Stability—The stability of a governor means its ability to return to a position of equilibrium after it has been displaced from that position, and it is measured as restoring force at unit displacement. Stability relates to the work capacity of a governor; it is the force available for overcoming passive resistance; it indicates the ability of the governor to act as a shock absorber. The stability required depends upon the passive resistances that the governor must overcome in accomplishing its purpose, and also upon the nature and extent of the active forces impressed on the governor from external sources. Stability of regulation and the smallest permissible static fluctuation, depend in part only upon the properties of the governor, a large part of the responsibility rests with the engine itself. An unstable governor is one in which the restoring force is negative, urging the governor farther away from its position of equilibrium when there is a change of speed. If regulation is stable, the governor will not hunt or give erratic action at full load.

It has been determined experimentally that the stability can be simply expressed as the difference of the tangents to the angles K and I . The angle K is formed by a tangent to the C_f curve at the point where it is desired to determine the stability; the angle I is formed by a line drawn from the origin through the same point.

The stability then is

$$Z = \tan K - \tan I.$$

The governor is stable as long as angle I is less than angle K , or angle K is within the angle I . If a governor is too stable, an excessive speed change will be necessary to cause it to move to a correcting position. An increase in the slope of the $\tan K$ will result in an increase in stability, and likewise an increase in static fluctuation. The stability should be at the minimum value necessary for the particular conditions, allowing the static fluctuation to be small.

Application of Analysis in Governor Design

Changes in the design of a governor and control system to secure a smaller static fluctuation and a lower stability value may be enumerated as follows:

1. Using only a small portion of the total travel of the governor-balls for speed regulation will give a smaller static fluctuation, since the angles I_u and I_d will approach each other, their difference becoming less. This can be accomplished by using a throttle valve requiring less than 90 deg. total movement, as 60 deg. or less. The limiting condition is when the total movement becomes so small that hunting or periodic speed fluctuations ensue.

2. Increasing the weight of the governor balls will increase the values of the C_f curve. If the location of the ball center of gravity remained the same, the new curve would be parallel to the original one, though of greater value. The difference of the tangents of angles I_u and I_d will decrease, and the static fluctuation will decrease proportionately with increase of ball weight. The stability likewise decreases, but not as rapidly.

3. Change of spring characteristic, so that the spring tension will increase more rapidly with change of spring length, thus giving the C_s curve a greater slope. The springs will then exert a greater resisting force to the centrifugal force of the governor balls, at the higher speeds. This will cause the C_f curve to have less slope, and thus reduce the static fluctuation.

4. The length of the lever arm L_3 of the spring hanger may be increased so that a greater tension will be exerted at higher speeds, reducing the static fluctuation in a similar way as by method 3.

5. On decreasing the radius of the center of gravity of the governor balls about the governor axis, by moving the center of gravity of the balls, and therefore the force curves, nearer the axis of rotation, causing the angles K and I to approach each other, the difference of their tangents, which is equal to the stability, will become less, and the governor will become less stable and more sensitive.

6. Increasing the radius of the governor ball center of gravity about their fulcrum increases the arc path of the center of gravity. This causes the C_f curve to have less slope and brings the angles K , I_u , and I_d to approach each other, reducing their differences, thereby reducing static fluctuation and stability.

7. The values of the C_q curve can be lessened by decreasing the frictional resistances of the moving parts; by decreasing the weight moments of the levers; by the elimination of throttle valve torque by using a balanced throttle valve; and by the elimination of throttle springs by using a balanced throttle valve.

Changes in the position of the governor balls with

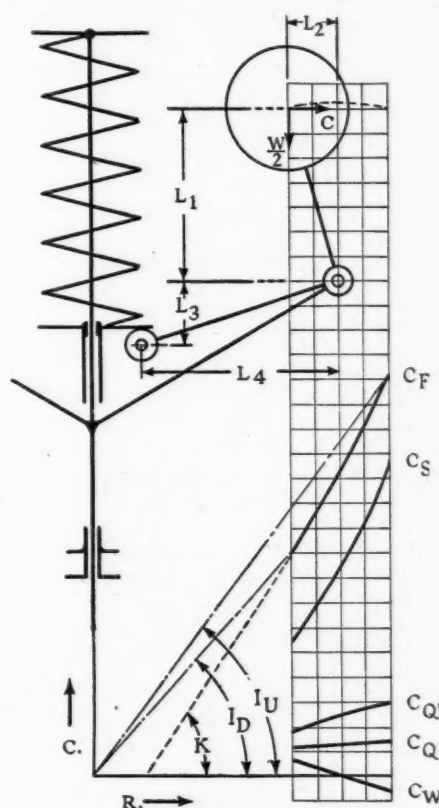


Fig. 4

change in speed are converted into a linear movement of sliding members along the governor axis and are transmitted by levers and rockershafts to the throttle. The parts in the system should be designed with a minimum of frictional surface and resistance, and weight moments. Many of these parts can be eliminated by placing the governor directly at the throttle, driving it through shafting and bevel gearing, and operating the throttle with a simple bell crank. See Fig. 8. The ordinary 90 deg. butterfly valve produces a torque due to the difference of pressure on its upper and lower faces, when approaching the closed position. See Fig. 5. The pressure drop takes place with less travel at the bottom of the valve, and a greater pressure difference will therefore exist at the bottom than at the top. A balanced throttle valve will be free from air flow torque in all positions, obviating the use of springs. A balanced throttle valve is shown in Fig. 7.

There are three types of hardened thrust buttons and shoes for receiving the linear movement of the rotating parts and transmitting it to the non-rotating elements. See Fig. 6. The flat surface type of thrust button and shoe offers the greatest frictional resistance and suffers the greatest wear. The ball type is next. The conical type is the most satisfactory, since the cone apex has contact with the thrust button at the governor axis where the angular velocity of the rotating button is zero. In all three types, with the governor in mid position, the center

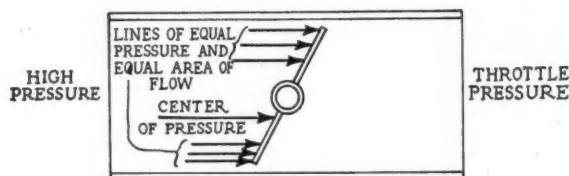


Fig. 5

of the rocker shaft should be in a line passing through the point of contact of shoe and button, perpendicular to the governor axis.

Steam turbines and other prime movers in which close regulation is imperative, use hardened knife edges and hardened seats for supporting the governor balls and transmitting their movement to the sliding sleeves. The knife edges are not lubricated, as a lubricant would retain abrasive material on the hardened seats, causing excessive wear. Refinements of this character are unsuited for truck and tractor engines, as the knife edges would deteriorate too rapidly from the vibration and action of oil and grit.

The governor balls should be machined all over to insure absolute similarity with respect to total weight, the location of the center of gravity, and the location of the center of support, or fulcrum. When the governor is up to speed, any variation from exact similarity will cause unbalanced couples, vibration, binding action on the supporting pins, and frictional resistance to change of position.

The method of application of the governor spring force should be such that the unbalanced forces and frictional resistances will be a minimum. A single spring mounted on or along the governor axis, is preferable to two springs mounted on the governor balls. In the latter design, unbalanced forces will result from the lack of uniformity in spring tension, weight and suspension.

Constructing Characteristic Curves for a New Governor

The procedure for utilizing the characteristic curves of a particular governor as the basis of design of a new governor, is as follows:

1. Assume a location for the governor ball fulcrum with respect to the governor axis.
2. Locate the point of application of the device for transmitting the movement of the governor balls to the sliding member.
3. Ascertain the angular movement of this device necessary for completely opening and closing the throttle. Plot its arc path.
4. Locate the center of gravity of the governor ball. Plot its arc path with reference to the arc path of (3). The center of gravity is usually taken so that a line passing through the ball fulcrum parallel to the governor axis will bisect the arc path of the center of gravity.
5. Determine upon the weight of governor ball which, acting through its center of gravity, will give the desired centrifugal force values.
6. Compute the centrifugal force values and plot the C_f curve.

The centrifugal force values can be computed as follows:

$$\text{Centrifugal Force, } C_f = 0.00034 W R N^2$$

Where—

W = Weight of governor balls, pounds.

R = Radius of balls, feet.

N = Revolutions per minute.

The relation between the engine speed, throttle opening and position of the governor parts can be determined by running the engine at the desired full and no load speeds, observing the corresponding throttle openings, then, by a suitable layout, determining the corresponding positions of the governor parts. Compute and plot the C_f curve, assuming a speed range and governor action considerably in excess of that desired, in order to observe the curves at other than the range that will be utilized.

7. Plot the C_q curve of the known resisting forces that can be computed.

8. Plot the C_q' curve of the unknown resistances. Compute their values from the C_q' curve of the original governor as moments about the fulcrum through the center of gravity of the balls, by a comparison of the new and original moment arms.

9. Plot a curve representing the sum of the C_q curves.

10. Subtract the total C_q values from the C_f values, plot their differences as the C_s curve. The moment of the spring force, plus the other centripetal or resisting moments, must equal the centrifugal forces for a state of equilibrium.

11. Assume a point of application of the spring force, compute from the C_s curve and from the moments involved, the spring tension required throughout the governor range.

12. Compute the type and size of spring that will give the required spring characteristic. If a spring of impractical dimensions is obtained, change the assumptions of (11), and recompute.

13. Note the static fluctuation and stability of the new governor for the speed range desired of the engine.

The effect of the numerous variables of governor design can be noted by means of the characteristic curves. Upon completion of a preliminary design, running tests should be conducted and a set of characteristic curves constructed on the basis of the tests. Further analysis and refinement can be continued until satisfactory governing is secured.

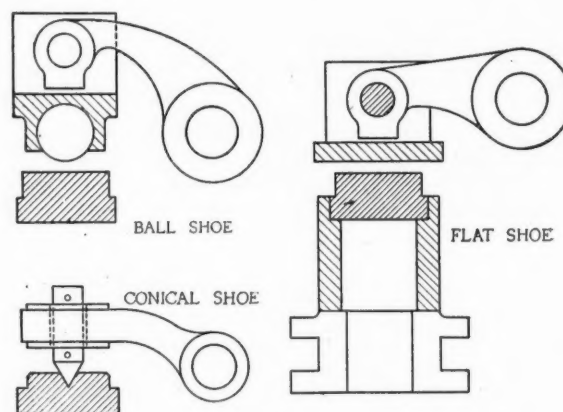


Fig. 6

Governors having combined inertia and centrifugal elements will maintain very close speed regulation, can be manufactured economically, and are reliable under continued severe service. A static fluctuation of 1½ per cent is easily secured from steam turbines, reciprocating steam engines, gas and oil engines, by the use of such a gov-

error. The traversing time for this type is considerably less than that of a purely centrifugal governor, since the more suddenly the change in speed is applied, the more promptly the inertia element will act.

A pure inertia governor having no centrifugal element will consist of a rotating element as a balanced flywheel, in which the speed change relative to the engine can result only from a change in the angular velocity of the engine shaft. The inertia governor obtains its regulating force from the tangential inertia resulting from a change

error is entirely too sluggish for close regulation, its traversing time is too great. The small reciprocating steam engine encounters similar load conditions to that of the tractor engine, but close regulation is achieved by the use of combined inertia and centrifugal force governors. A governor of this combined type admits of more economical manufacture than a centrifugal governor capable of securing the same regulation.

The Pierce Governor

As an example of contemporary centrifugal governor design, the Pierce governor as manufactured by the Pierce Governor Company of Anderson, Indiana, has met with marked success in both motor truck and tractor service. Examining its design with reference to that section of this article entitled, "Application of Analysis in Governor Design," it is found that many of the recommendations mentioned have been incorporated in the Pierce governor.

The throttle valve, shown in Fig. 7, has a total movement of 56 deg., and complete opening and closing is accomplished with a minimum movement of the governor weights. The sliding plunger, which transmits the governor weight movement, is contained within the spider shaft and the governor spring is located in a separate compartment. The governor weights are placed near the governor axis. This design permits a minimum radius for the weight center of gravity about the governor axis and produces a sensitive governor as enumerated under item (5).

The governor weights are comparatively long, their center of gravity has a long radius about their fulcrum, thus securing improved regulation as noted in item (6). In eliminating the usual levers and shafts by attaching the governor directly at the throttle, considerable frictional resistance is avoided. Using a balanced throttle valve, eliminating the throttle springs and throttle reactions, removes a very considerable resistance to governor action. The single governor spring is distinct from the rotating elements, and its tension can be changed while the engine is running, permitting a limited speed adjustment. The adjusting screw can be sealed to prevent its being tampered with. The use of ball bearings and

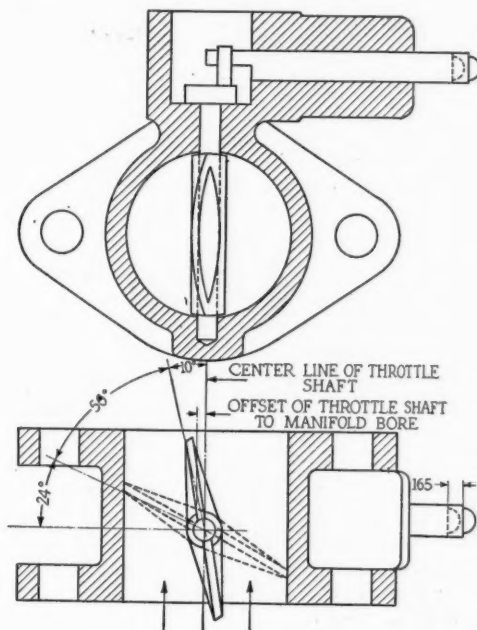


Fig. 7

in the relative angular velocity of the engine and inertia elements. If the engine load is released and the engine speeds up, the inertia element will remain at the original speed, the regulating force available is the product of the relative change in angular velocity of the engine and inertia element, times the moment of inertia of the inertia element. Similarly, an increase in load and decrease in engine speed, produces tangential inertia which is available for correcting the speed condition.

A governor consisting only of inertia elements is impracticable, since it does not adjust for any particular speed, but simply tries to keep constant the accidental speed at which the engine happens to be operating. To secure a governor that is practical, it is necessary to combine tangential inertia with centrifugal force by introducing a centrifugal element which will act as a speed counter.

There are several features of a combined inertia and centrifugal governor which recommend it for tractor service. It can be designed to overcome a considerable resistance in the throttling mechanism and still obtain close speed regulation. The more frequently and suddenly the load changes are applied, the greater the regulating force available in the inertia element, since the tangential inertia will be exactly proportional to the change in angular velocity. Likewise, the traversing time of this type is much less than that of the usual centrifugal governor. The load variations of tractor service, especially with belt work, are of considerable amplitude and fluctuate quite rapidly. The usual centrifugal gov-

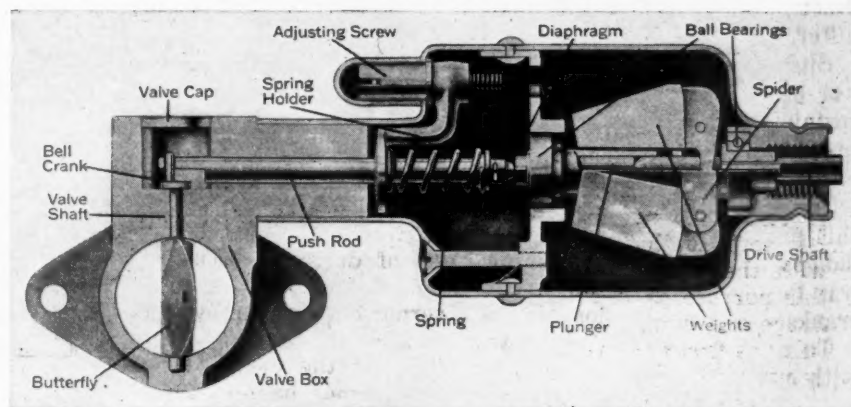


Fig. 8

the mounting of the governor free from interference with the hand throttle are likewise commendable features.

THE Italian Government has forbidden manufacturers of automobiles and motors to sell more than 10 per cent of their production in the country. It is hoped that by selling the bulk of Italian automobile production abroad an improvement in the rate of exchange can be effected. Large numbers of automobiles and quantities of automotive parts are said to leave Italian ports almost every day.

Case-Hardening Process for Crankshafts Successfully Developed

After considerable effort and experiment a process for case-hardening crankshafts has been developed which meets the requirements of efficient production. Shafts are now in regular production under this method, which is described in detail in the following article.

By Norman G. Shidle

CASE-HARDENED crankshafts are common in Europe, where bronze bearing bushings are used, but are a novelty in this country. The development of a satisfactory process for case-hardening cranks involves many difficulties. While the theory of the process is well understood, it is not easy to meet the requirements of economy and efficient production. Such a process has been worked out, however, by one automobile manufacturer, and case-hardened crankshafts are being produced regularly. Some minor difficulties still remain to be solved, but the process, as now being used, is satisfactory both as to methods and results.

Tests made by the H. H. Franklin Manufacturing Company have shown that a car with case-hardened crankshafts can be driven an average of 50,000 miles before the bearings require to be readjusted. Thus the results obtained from the case-hardened shafts are commensurate with the increased cost of production. Because of the novelty of the practice in this country, a detailed description of the methods should be of particular interest.

The points of interest are those in which the manufacture of the case-hardened crankshaft differs from the manufacture of the ordinary shaft. All of the operations performed in the production of the ordinary shaft are necessary as well in making the case-hardened shaft. The description may start, then, at the point where the methods differ.

Since it is necessary to straighten the shaft after it has been case-hardened, its elasticity must be retained; certain parts must be shielded against the hardening process. The two ends of the shafts, moreover, must be left soft, so that they may be machined to fit properly with the cranking clutch and the driving clutch. For this purpose $\frac{1}{8}$ inch of stock is left on both sides of the flange and thread ends. To leave certain parts soft, then, was the first problem. Only the bearing surfaces of the crankshaft are case-hardened.

To accomplish this, the bearing surfaces are wrapped with ordinary electrician's tape. The shaft is then copper-

plated, a process requiring about twenty minutes. Thus the copper-plating covers the cheeks and the ends, but it is excluded from the bearing surfaces which are to be hardened. Other methods of excluding the copper plating from the bearing surfaces have been tried, but none have been successful. Various kinds of compounds and paints were tried, but were rendered ineffective by the strong acids to which the shaft is subjected preparatory to the copper-plating process. Iron clamps lined with rubber have also been tried. These exclude the copper-plating successfully, but become rusted and stiffened rapidly and are thus made very difficult to use.

The tape has been found to best meet the requirements, but is open to the objection of requiring considerable time to wind and remove. This is one of the points in the process which will probably be subjected to further refinements.

After the cheeks have been copper-plated and the tape has been removed from the bearing surfaces, the crankshafts are taken to the carburizing ovens. Four double chamber ovens (Fig. 1) are used, each having a capacity of fourteen shafts. The shafts are packing oblong metal carburizing boxes, illustrated by Fig. 2. Two shafts are contained in each box. The boxes are then placed in the carburizing furnaces and allowed to remain there about 22 hours. This length of time was determined by experiment as being necessary to obtain the depth of penetration desired.

When the boxes have been removed from the carburizing furnace they are allowed to cool gradually. When the shafts are cool enough to handle, they are removed from the carburizing boxes and taken back to the machine shop to be straightened. This is the first of the straightening operations, of which there are two; that is, the shaft must twice be trued up, once during the process and once at the end. The reason for this will be apparent later.

Since the copper plating of the two ends and the cheeks has resisted the carburizing, the shaft still retains its elasticity, and thus is capable of being straightened.



Franklin six-cylinder crankshaft. Arrows indicate parts which are case-hardened, and parts left soft to allow shaft to retain elasticity for straightening

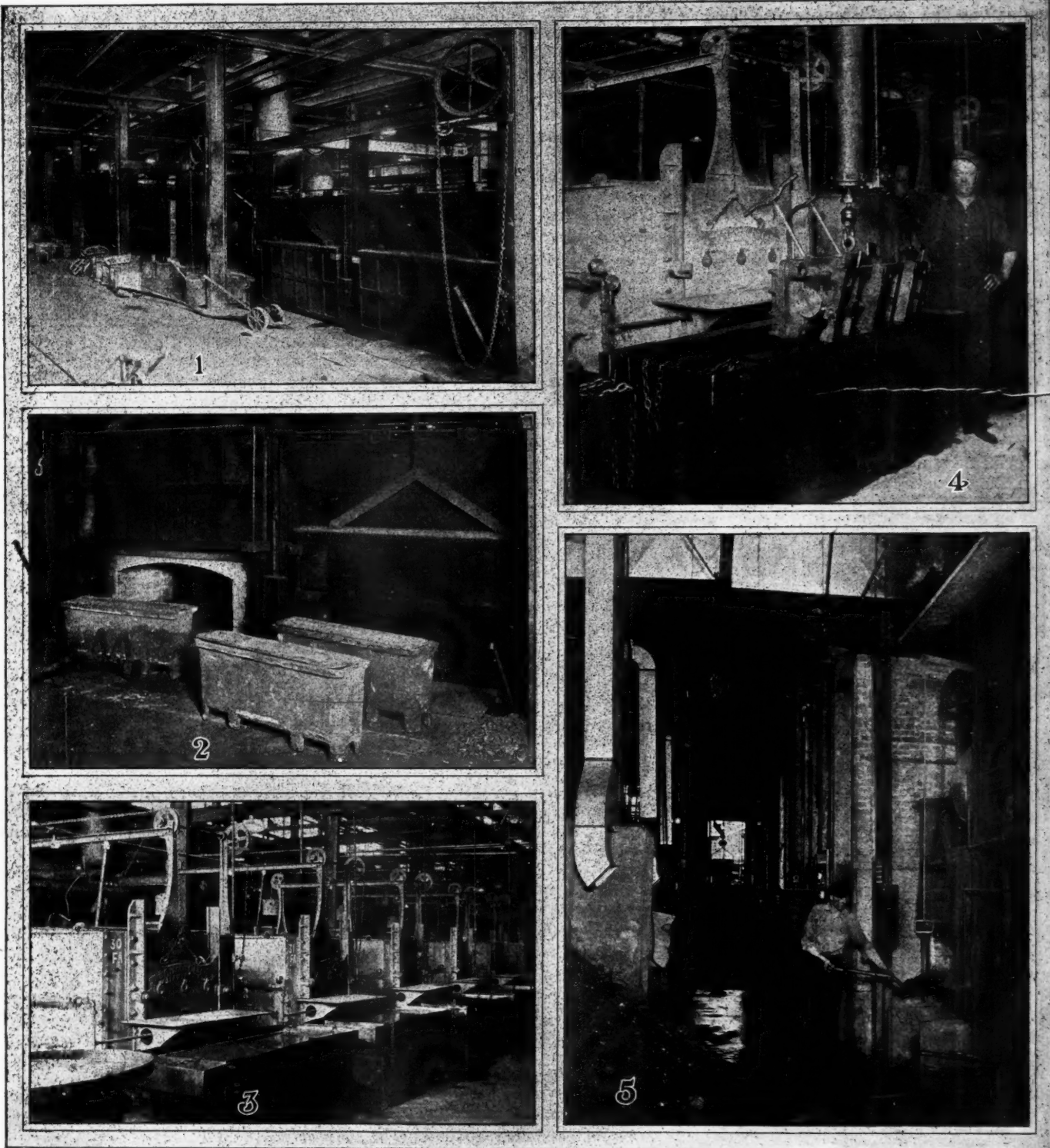


Fig. 1—Ovens used in carburizing operation. Fig. 2—Carburizing boxes, in which shafts are placed before being put into ovens. Fig. 3—Furnaces and cooling tanks used in case-hardening. Fig. 4—Specially constructed die, in which shaft is placed when removed from furnace. When the shaft has been clamped in the die, the whole die is immersed in cooling tank. Fig. 5—Blower ventilating system is used throughout the heat-treating department. This illustration shows the installation in the firing pits

Next, the machine work is done on the flange and thread ends, the $\frac{1}{8}$ in. stock being removed and the parts machined to their proper sizes.

The ends having been machined and the shaft trued, it is ready for the final hardening process. The shaft is taken back to the heat-treating department, placed in a furnace and heated to a temperature of about 1420 deg. The furnaces used for this operation are shown in Fig. 3. It remains in the furnace for three hours, and is then

removed and quenched in cold water in a convenient tank.

At this point another serious difficulty was met and overcome. It was found that if the shafts were merely quenched after being removed from the furnace, they twisted out of shape so far that subsequent truing was practically impossible. To meet this trouble, a die, shown in Fig. 3, was devised, into which the hot shaft is clamped. This die is handled by means of an overhead monorail system and an air hoist. The whole die is then

plunged into the cold water and the shaft remains approximately true as the case-hardening process is completed.

Since the die is accurately constructed to the form of a straight crankshaft, the shaft must be approximately straight when it is placed in the die; otherwise the die will jam, and the operation be spoiled. This is the reason for the first straightening operation after the shaft has been carburized.

This special die is very heavily made of cast iron with "V" blocks of hardened high grade steel, which come in contact with the bearing surfaces of both main line and crank pin bearings. The small area of contact where these "V" blocks touch shaft remains soft. These spots on any one bearing, however, are so small as not to interfere with the wearing qualities of the finished bearing.

Taking the shaft from the furnace and placing it in the die must be done very rapidly. If too long a time elapses between the time the shaft is removed from the furnace and its immersion in the water, the shaft will be too soft when finish ground. Considerable study of this operation and some changes in the original construction of the die were necessary in order to have the operation performed rapidly enough. The shaft is now removed from the furnace, placed and clamped in the die and immersed in water in about 25 seconds. This speed is rapid enough to give the shaft the desired degree of hardness.

The next step is to straighten the shaft again. The problem of straightening was one of the most difficult encountered throughout the process. As noted in the steps described, every mechanical precaution is taken to keep the shafts approximately straight throughout the various stages of manufacture. Even with these aids, however, much depends upon the final truing process. For some time, the difficulty of getting this work done, accurately and rapidly enough to meet production needs, was so great as to threaten the success of the entire process.

Several skilled men were put on the job, however, paid on a day rate, and given every opportunity to become proficient. In this way four or five skilled men were developed to do this truing job. These men have become so proficient that they can adequately handle the production needs of the plant in this respect. The job which they are doing cannot be done mechanically, yet it is one of the vital steps in this process of case-hardening crankshafts. Thus even in this predominantly technical process, the human element plays an important part. If it had not been possible to develop the skill of these men to a high point, the entire process would probably have had to be abandoned as not being practical for production purposes.

After the final straightening, the bearing surfaces are finish ground with a very fine grinding wheel, and the finished machine work is done on the soft parts of the shaft.

Results Justify Work

H. P. Harrison, master mechanic of the Franklin factory, to whose efforts the successful development of this process is largely due, states that there is about one-third more work involved in the manufacture of a case-hardened crankshaft than in the making of the ordinary soft shaft. While no accurate cost figures are yet available, Mr. Harrison says that the excellent results obtained from the case-hardened shaft fully justify the additional expenditure necessary to manufacture them.

In making the Franklin shaft a machine steel forging having a carbon content of 15 to 20 points is used. A depth of case of 1/16 in. is required. The degree of hardness to which the shafts are brought is between 75 and 85 points, as indicated by scleroscope reading. A working range of between 65 and 100 points is allowed.

Longitudinal shrinkage was another difficulty encountered. No longitudinal shrinkage occurs as a result of the carburizing process, but after the shaft is finally quenched this trouble appears very distinctly. Experiments showed this shrinkage to be approximately uniform, however, so that it can be overcome by simply machining the shaft a certain predetermined amount longer than required by the gages for the finished shaft. A slight distortion in the spacing of the crank pins was also found, but was not serious enough to require correction.

While the above description embraces the various steps in the actual process of case-hardening crankshafts, certain important corollaries have been instrumental in making the process a practical and commercial success.

The handling of the carburizing boxes, for instance, is accomplished by means of an overhead hoist and conveyor system, which permits the movement of a fully packed, 550 lb. carburizing box quickly and efficiently. This monorail equipment is used in moving loaded boxes from the charging floor to the cooling floor and also from the cooling floor to the packing floor. A special mixing and sifting apparatus has been installed to handle the large amount of carburizing material necessary for this work. A power driven elevator with a storage hopper has been installed for use in loading boxes with carburizing material by simply allowing it to flow by gravity from the hopper to the boxes.

A specially designed tank has been constructed in which to quench the shafts. The water is fed into this tank from a horse-shoe pipe in the bottom, and is ejected by an equal overflow on all sides. Thus every part of the tank is constantly being filled with fresh water, the distribution of which is equal throughout.

Human Element Studied

Besides the straightening operations, which depend to a large extent upon human skill, it will be noted that the bringing of the hot shaft from the furnace, clamping it into the die and quenching it is also a vital point in the process. This operation, too, depends largely upon the deftness and skill of the men doing the job.

Since the human element is so important in supplementing the mechanical phases of the process, special attention has been given to providing conditions under which men can do the best work. The monorail system for handling heavy work is one example of this assistance. The blower ventilating system which has been installed is another and very important feature in helping to render this process practical and successful. A blower system, operated by a powerful fan, constantly brings fresh air into the heat-treating department, the foul air being passed out through the movable section of the saw-tooth roof. This system was installed in preference to a suction system, because the latter was likely to be "short-circuited" by an open door or other opening.

The result is that this department, usually an extremely hot, dirty and unpleasant one, offers as pleasant working conditions as any other in the plant. The men in the firing pit, for instance, are specially benefited by this ventilating system. A separate pipe brings fresh air to each fireman, so that he is not affected by the gases and fumes common to his working place. Fig. 5 shows this installation.

Special care is taken to keep this department clean; the saw-tooth roof provides adequate light, steam coils give standard temperatures in cold weather, and in every way the workmen, upon whom the success of this new process largely depends, are given an excellent opportunity to perform the best service.

In analyzing the part played by the human element in this process, the necessity for keeping the same men on

the job is obvious. High labor turnover, with the constant necessity of breaking in new men to these comparatively delicate tasks, would mean much loss both in time and money. The efficacy of such provisions for the heat-treating department as have been made here is evidenced by the statement of George Deutcher, the Franklin employment manager.

Mr. Deutcher was asked if there had been any appreciable difference in the labor turnover of the heat-treating department since the installation of the new ventilating system. His answer was something like this:

"Before the installation we had the greatest difficulty in keeping men at work in that department. The labor turnover there was about four times as great as the average plant turnover, the latter having been 64 per cent during 1919. Our labor turnover in that department now,

I can almost certainly say, is slightly lower than the average for the plant. This result is due in part to exceptional human relations work on the part of the foreman, and in part to a readjustment of working hours; but a large part can safely be attributed to the provision of working conditions which are exceptional for a heat-treating department."

The present discussion has given in detail some of the chief problems that were met in one of the first successful attempts in this country to manufacture a case-hardened crankshaft for a passenger car. The process as it now stands will probably be subjected to further refinements as experience shows where improvements can be made. It has reached a sufficient point in its development, however, to be termed successful in a practical way, and consequently its details hold a special interest.

Electric Furnace for Spring Tempering

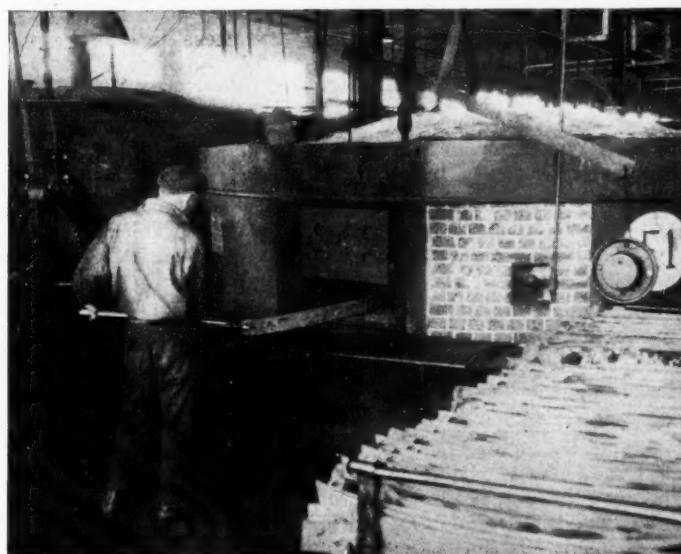
OWING to the accuracy with which the temperature in electrically heated furnaces can be controlled and the uniformity of heat distribution which can be obtained, electric furnaces should be particularly suitable for use as tempering furnaces for vehicle springs. Two such furnaces have been recently installed by the Spring Perch Co. for tempering automobile and vehicle springs. These furnaces are round in form and about 12 ft. in diameter, the hearth consisting of a revolving steel table, 128 in. in diameter. These tables are driven by an electric motor, and the speed can be varied from one revolution per hour, to one in twenty minutes, according to the class of work to be done. The springs are put on this table through a door in the side, and taken out of the same door when finished. With this arrangement the production is about 2000 lb. per hour for each furnace, or in a sixteen hour day the two furnaces turn out about 64,000 lb.

The electric heating units are installed in the roof of the furnace, about 10 in. above the table. They are of the General Electric Co. 950 deg. F. type of heating unit, and from a connected load of 85 KW for each furnace. The roof of the furnace is arched, so as to reflect the heat, and give an even distribution of heat throughout the interior

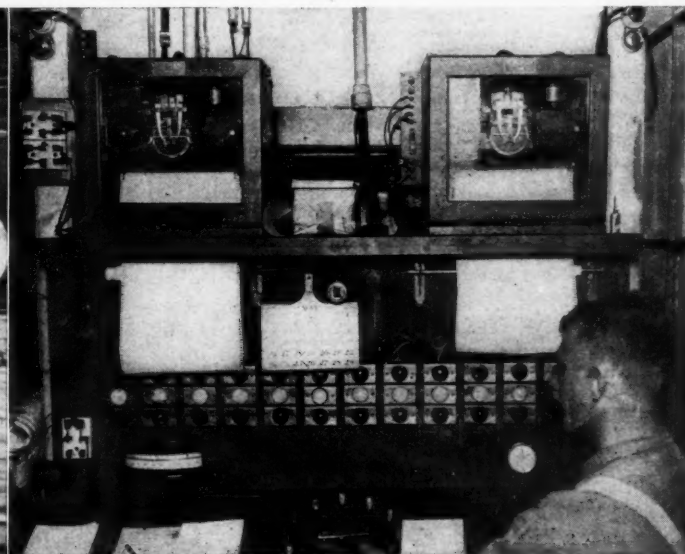
of the furnace. All hot spots which would cause some springs to be heated more than others, or otherwise destroy the uniformity of the product, are said to be eliminated by this method of construction.

The control, which is entirely automatic, was also supplied by the General Electric Co. and consists of a contractor panel for each furnace, controlled by a temperature regulator, which is installed in a booth at some distance from the furnace. All that is necessary to obtain any temperature desired between 800 and 1000 deg. F. is to set the regulator and close the switch for that furnace. Owing to the automatic control the furnace will run itself, and keep to the exact degree of heat required. Since it is desired to vary the degree of heat, in accordance with the varying composition of the springs to be heated, the value of reliable and flexible temperature control at all periods is self-evident.

Accurate temperature control and evenness of heat distribution for any temperature are the factors that guarantee uniformity of the finished product. The Spring Perch Co. subject all their products to a Brinell test to determine their perfection before shipping, and claim that they are almost absolutely uniform.



Electrically heated rotary type heat treating furnace in actual operation



Recording and indicating automatic control instruments on top of panel

Co-operative Store Educates Employees in Business Principles

While the primary object of the co-operative store is to beat the high cost of living, it may also serve as an effective means of teaching the employee the difficulties of finance, selling, and business administration. When the company runs the store this educational effect upon the employee is lost.

AN employee can often be taught more about the necessity for and the difficulties of finance and sales by a little practical experience than by hearing a great many talks and reading a great many pages of type.

A visitor to a large Ohio tool works the other day was introduced to one of the shop foremen. After the usual formalities were passed, the foreman asked the visitor, "Are you in mechanical production work?" The visitor answered that he was not. "Well, you should be glad of that," the foreman said, "as in this sort of work you certainly have a lot of troubles. But," he added suddenly, "producing the machines is only a small part of the business, and not the most difficult at that. The big thing is to sell the machines after they are built.

"I was mixed up in a little outside business deal myself not long ago, and I found out for the first time how important selling the product is, and how hard financing is. Selling is the big thing. That's what I tell these fellows in here. A lot of them think that all they have to do is to build the machine, shove it out of the door, and collect the money in their pay envelopes. It would be easy if that was all there was to it.

"I never realized the importance of the selling angle until I had this little business experience recently, and since then I've been telling a few things to these birds that think there's nothing to it but to build the machines."

It is not possible, of course, for every workman to go through an experience such as this foreman did, but the influence of one such man spreads very widely throughout a shop. The co-operative company store often loses a valuable opportunity in this respect, when the management takes over all the bookkeeping and administration work.

Co-operative Store Under Employee Control

A manufacturing plant in Rochester, N. Y., which employs about 1100 persons, has a co-operative store in successful operation which illustrates the feasibility of having the entire control of financing, operation and administration in the hands of the workers. This store is conducted by the employees of the Art in Buttons, Incorporated, button manufacturers.

The store was started by a number of employees on their own volition. In fact, the president of the company stated recently that it had been in operation some two months before he was aware of its existence. In the beginning only one or two articles, the retail price of which had gone up very high, were carried. The original stock was financed by the joint contributions of about ten employees, who bought this limited stock and sold it slightly above cost; high enough to cover merely the expense of handling, transportation, etc.

The experiment having been thus far successful, additions were made to the stock of goods, further financing

being done from the proceeds of the first operations. The only thing which has been furnished by the company is the space for the store, and the light and heat necessary for operating it.

The store now carries a full line of staple groceries, including sugar, crackers, baking powder, bran, two grades of beans, cheese, citron, cocoa, coffee, cornstarch, breakfast foods, flour, fish, gelatines, several grades of canned milk, soap, tea, tomatoes, tobacco, and so forth.

Service in the store was for some time on a voluntary basis, various girls and men giving a part of their spare time to selling the goods. This method is still used to a large extent, so that the store is open only outside of working hours. For the week-end rush, however, it was found necessary to employ a girl especially to sell goods in the co-operative store. The wages of this co-operative employee were met by a slight increase in prices.

The administration of the store operation is under the employees' council, a group elected by the employees from within their ranks to represent them in relations with the management and in the conduct of various employees' activities.

The following bulletin issued by the co-operative Grocery Committee of the Council indicates briefly the methods used in selling, ordering and delivering goods to the customers.

HOW TO GET GROCERIES FROM THE EMPLOYEES' CO-OPERATIVE GROCERY STORE

Write your order on slip of paper and drop it in the box at grocery store, through slot in wall of the store.

A sign is posted where this box is located.

Put your order in from two to four days before you want it. Four days before is better. This gives us a chance to put up the order and have it ready when you call for it.

Friday afternoon and Saturday noon Mr. Burns, who is cashier, sits at the cashier's window, and you give him your name and pay for the goods you have ordered. He issues to you the original copy of your order as your receipt at the large opening next to the cashier's window, and your order will be handed out to you, and on it is the duplicate of the copy of your order.

If by any chance we are out of any item on your order, keep this duplicate slip and present it again and if the goods are in you will receive them. If not in and you want your money back, present the slip to the cashier and you will receive your money.

Remember that this is a co-operative store, the committee of workers are volunteer workers who finance and do all of this work without pay and you as patron of the grocery are a member of the co-operative group, and the committee asks you to kindly follow the foregoing system. *Any deviation from this system makes more work for the Committee.*

We sell candy, nuts, tobacco, gum, oranges, etc., without an order at noon. Not groceries.

DON'T ASK US TO PUT UP GROCERY ORDERS AT NOON. GET YOUR ORDER IN AHEAD AS REQUESTED ABOVE.

Don't ask us to sell anything after 12.55, as the committee has to get to their respective departments at three minutes before 1.

CO-OPERATIVE GROCERY COMMITTEE.

Thus far the inception and growth of the Art in Buttons co-operative store closely parallels that of a similar store established recently in a large automobile plant. Both grew along similar lines and finally found it necessary to hire someone to help out in the actual operation of the store. At this point the development diverged.

At the automobile plant, the management offered, in the best of good-will and desire to be sincerely helpful, to take over the onerous burden of bookkeeping, as well as that of financing and operating the store. Thus the employees were relieved of that extra task. The company's offer was made in thorough good faith. It was accepted. The store is at present running successfully on the new basis.

The employees who started that store have gained a knowledge of the great difficulties of administering any business, no matter how small, and they have received the best possible kind of education in the problems of finance and management. Now, however, with all this work in the hands of the company, that educational possibility is removed. More employees each year will not become familiar with the things they might have learned from an active participation in running this little co-operative store.

The Art in Buttons store has proceeded straight along the lines of its original development. When it was first

found necessary to hire a girl to help in selling and wrapping goods, the company did make an offer similar to that which was accepted by the employees of the automobile concern. The store seemed to the management to be an excellent institution, and its offer was made in the same spirit as that of the automobile management—a spirit of helpfulness. It was prevented, however, from making the same mistake as the other firm by the action of the Council to whom the offer was submitted. The following is quoted from the Proceedings of Session of the Council:

"The patronage of our co-operative grocery store became so large that it was impossible for our volunteer committee to efficiently handle the orders. On the recommendation of the Council a part-time paid clerk was secured for the week end rush of putting up orders.

"In connection with the above, the Council declined the corporation's offer to pay for this help, preferring to have the small expense incurred added to the price of the goods in order that our store might be truly said to be 'run by the employees.'"

The experience in business administration thus gained by the workers is very valuable in giving them an insight into the problems and difficulties which face the management in its administration of the business as a whole. It takes away, as well, the possibility of suspicion arising among the men concerning the honesty of the store administration. Both of these factors aid materially in preparing a common meeting ground of mutual confidence and understanding upon which disputes and differences can be brought and successfully thrashed out to the satisfaction of both management and employees.

Setting Standards for Personnel Administration

"CERTAINLY no more serious situation could be conceived than one in which millions of people are destined to be confined for eight or nine hours of close application, to labors which are indifferently or even grudgingly performed. . . . The permanence, productivity and humanity of any industrial system stands or falls in the last analysis upon its ability to utilize the positive and constructive impulses of all who work—upon its ability to arouse and continue the interest of the workers. The problem, therefore, demands searching study if we are to answer such inevitable questions as: Is interest in work as now carried on possible? If it is possible, how is it to be aroused? If it is not, how can we so modify conditions that interest will arise?"

The foregoing paragraph outlines the scope of a discussion of methods of arousing interest in work which comprises an interesting chapter in "Personnel Administration: Its Principles and Practice," a new McGraw-Hill book, by Ordway Tead and Henry C. Metcalf, members of the Bureau of Industrial Research. In the chapter mentioned the book reaches its greatest intellectual height. Not only are practical methods of arousing and maintaining the interest of the worker discussed, but certain fundamental psychological reactions are noted and analysed. These are shown to be the important factors in ultimately solving the problem.

The book as a whole sets forth the principles and the best prevailing practice in the field of the administration of human relationships in industry, and covers, sometimes in more detail than others, the various phases of work of the personnel department. Health and safety, principles of industrial training, methods of practical indus-

trial research and wage systems are among the chief topics treated.

The book maintains a progressive tone throughout, pointing out the practical advantages of the best modern thought concerning every phase of industrial relations. The authors possess a thorough knowledge of the field, both from a practical and theoretical standpoint. It is on the intellectual and analytical side, however, that the book chiefly excels. It will gain higher praise from the student of industrial affairs than from the average employment manager. It is valuable rather as a guide for the chief executives of a firm in determining personnel policies than as a practical manual for the use of the man who is to install the actual mechanical phases of employment work. In brief, "Personnel Administration" fulfils its purpose more fully as regards principles than as regards practice.

In discussing the problem of foremanship, an exceptionally frank and complete analysis is made of the attitude of the foreman and the facts which color his point of view. The conclusion is reached that "unless the foreman is a remarkable fellow he is likely to be in the wrong mental attitude to deal with workers. It is not a matter for blame; the foreman is simply the victim in his own field of the rapid growth of the industrial system. His position nevertheless calls urgently for understanding and correction."

If the excellent discussion of principles embodied in this book could be supplemented by a more practical book concerning the actual methods and forms to be used in installing personnel and employment work, the literature on this subject would be much more complete than it now is. The latter phase has not yet been satisfactorily treated.

Now Is the Time to Retool the Factory

Mr. Manufacturer, are you quite sure that you are going to be able to meet competitive prices when the buyers' market is squarely presented to you? Will your labor costs be lower than before the war? They will be with some of your competitors and you must compete with them.

By J. Edward Schipper

REGARDLESS of all the other interpretations and predictions based on the period of readjustment through which we are passing, there is one fact which stands out more clearly than any other—the automobile and allied industries are coming back to the competitive stage.

Up to a few months ago, and for a period of four years, the industry has passed through a condition where demand has been greater than supply. The curtailment of production, due to war, and the resulting sales demand at war's close, made it possible to sell practically any kind of products at any kind of price, to a market which seemed as if it could not be appeased.

During that period of easy money there were two kinds of concerns:

- (1) Those who turned a good portion of their profits back into the business, and
- (2) Those whose sole ideas were momentary profits.

The former concerns are now about to gain the fruit of their far-sightedness, the others are in a position where they will have a difficult situation to meet.

A factory which has not practically retooled itself within the last three years is almost obsolete. Such a factory is going to be in a difficult position when the days of price competition are really upon us. We have not had this price competition for four years, but it is coming with the revival of business.

A study of conditions indicates that supply and demand is going to be very closely balanced from the automobile and truck manufacturers' standpoint when we have gone through the period of financial readjustment. With this balance, a concern which can turn out its product at a lower cost and can afford to sell it for less money is going to get the business. Those who cannot do so will suffer.

At present a great many factories are shut down in certain of their departments, which have produced sufficiently ahead to take care of present demand. The general condition is such that no better time could be afforded than the present for a very comprehensive study of the manufacturing conditions in the plant.

Now is the time for concerns who have not revised their tool equipment and brought it up to date to do so. It is highly important for the success of any manufacturing concern that it be ready to meet price competition, which means, in other words, the lowest possible manufacturing costs, just as soon as the tide of business turns.

We are now returning to a sane period. People who buy will "shop" more. That means the price will be more closely scanned than it has been during the past

four years. A manufacturer who sits back during this dull time, and thinks that his shop will be ready to go ahead and take care of the business as soon as sales pick up, will do well to ask himself the question:

"Am I really in a position to meet price competition?"

Machine tool design has advanced rapidly during the war period.

Is your competitor going to be better equipped from a tool standpoint than you are?

If he is, he is going to under-sell you.

To-day, many shops which, on war work, were running their machines continuously, often three shifts per day, expect this same machinery to be ready to fight their commercial battles when business is back to normal.

There has been a great amount of profit taking during the past few years. Those concerns which put a portion of this money into a reserve fund for machinery, or which purchased machinery, are going to be in the strongest possible position to take advantage of the market. It is very probable that wages will not return to their former level, even though they might drop further than they already have from a war standard.

Labor costs, however, can be reduced by proper machine equipment.

Manufacturers who have failed to keep themselves posted on the improvements in machinery adapted to their line will be surprised at the developments which have been made during even the last year. A fact which brings this out very clearly is the drop in prices on used machinery, while new machinery practically maintains its level. Not long ago, at a purchasing agents' meeting in Cleveland, it was stated that it was very possible that the machinery market would indicate a drop in prices, because of the fact that there seemed to be an extraordinary amount of used machinery on the market which was selling at exceptionally low figures.

The fact remains, however, that the demand for new machinery has been such that the price has been affected but little, if any. There are a great number of manufacturers who appreciate the necessity for now arranging their equipment for a lower production cost. This era of retooling is extremely necessary, in view of the fact that practically all of the factories have been pushed very hard during the war period and the active commercial period immediately following the armistice.

During the war and, in fact, for a considerable time after, it was impossible to get deliveries on new machinery and only a very few of the manufacturing concerns have managed to keep up-to-date in this respect. Some of the cost reductions which have been made during the last year by the installation of up-to-date manufacturing apparatus have been startling in the extreme.

It is not uncommon to find manufacturers on even large units, who, by means of better tools and better methods, have been able to increase production 200 or 300 per cent, with a 50 or 60 per cent cut in the amount of labor employed.

With this condition existing, it is easy to see how it is possible to keep the wages higher than the pre-war amount and yet have labor costs considerably lower. Conservation of man-power means more than the mere saving of wages. It means increased speed, increased accuracy, elimination of the fatigue element and greater reliability. It means lower cost and the ability to meet the market on a competitive basis.

Looking at the matter from a very broad aspect, one of the greatest sources of wealth in this country is improved machinery. The conservation of man-power is, of course, the greatest accomplishment of any nation. Further than this, it is the cause of the much lower price of manufactured articles. This puts the product within the reach of a great number of buyers, and furthermore, gives us a tremendous foothold on the export market, thereby increasing the country's prosperity because of its standing in the world's trade.

This does not necessarily mean that the manufacturer's profits are smaller, even though they should

be smaller per unit, because his business will be made up on the greater bulk of his output.

While this may sound like eventually leading to saturated markets, and, perhaps, in some industries does so, causing manufacturers to turn to other lines, the automotive field is so exceptionally well situated in respect to this that we need not look to any such thing for at least a generation, if ever. The use of the small, portable power plant is only in its infancy. With the ever increasing population of the world, more intensive farming methods must be utilized. This, of course, means motorizing. The transportation problems of the world are going to be solved largely by vehicles driven by internal combustion engines.

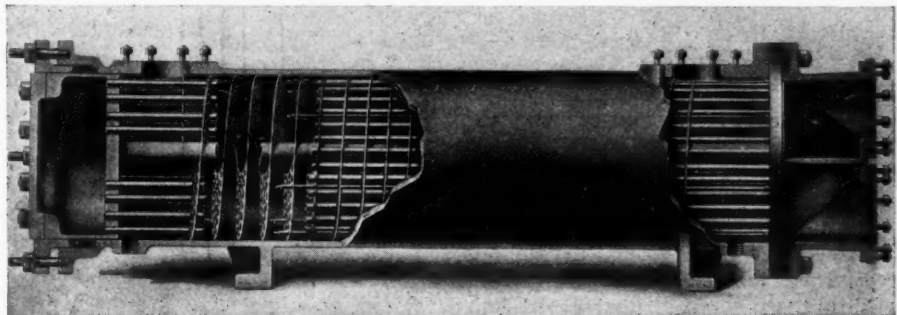
We are on the eve of tremendous developments in aerial transportation, and from an automobile standpoint there is certain to be an ever increasing percentage of the population which utilize these vehicles for business and recreation purposes.

Manufacturers with the proper breadth of view in this industry are going to prosper, but it is certain that only those who are properly equipped to enter the field on a competitive basis will succeed. It is a striking fact that those concerns which have been affected least by this lull in business are the ones which are noted for their excellent tool equipment.

Multiwhirl Cooler for Cooling Quenching and Lubricating Oils

A DEVICE for cooling quenching oil in the heat treating of steel or oil used in the lubrication of turbine bearings and reduction gears is manufactured by the Griscom-Russell Co. In either case the oil is constantly circulated through the cooler, thus maintaining it at a constant temperature and permitting the continued use of the original quantity of oil and its maintenance at the proper viscosity for efficient results.

The apparatus takes its name from the whirling path of the oil, due to the use of the helical baffle which directs the oil in its flow. This baffle also serves to bring the oil into intimate contact with the cooling surface and to insure a high rate of heat transfer.



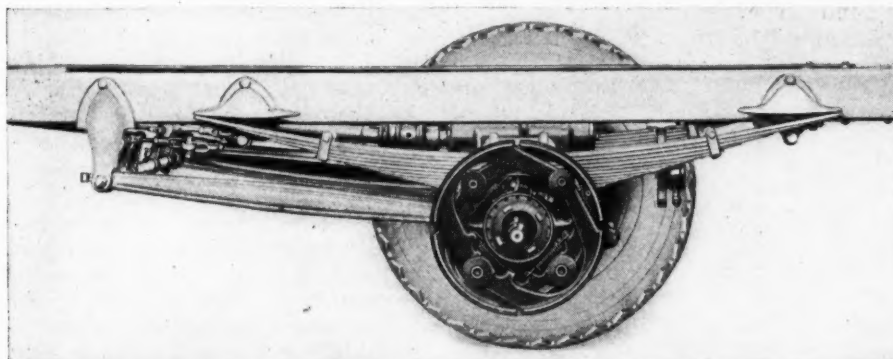
Multiwhirl cooler for quenching oil

Novel Suspension of Armleder Truck

IN a new 1-ton truck brought out by the Armleder Co., a special suspension is used whereby the half elliptic springs are automatically shortened and stiffened as the

load on the truck increases. The springs are 63½ in. long and bear with their ends against the convex surfaces of spring blocks bolted to the chassis frame. As the load increases, the line of contact between the spring and the pressure block automatically moves toward the center of the spring, thus reducing the length of the latter, until under full load the virtual length of the spring is 18 in. less than at no load. In this way the flexibility of an exceedingly long spring is combined with the strength of the short spring.

The radius rod and the rear propeller shaft are of the same length, and are mounted parallel to each other, whereby end thrust on the universal joint is eliminated and slipping of the propeller shaft prevented.



Novel Armleder chassis springs self-adjusting to load

Coolie Politics Bars Automotive Transport in East

This is a different view of the automotive export problem. It is the same problem that was fought out and solved by the farm machinery manufacturer in this country when farm labor opposed the reaper and binder. The writer indicates the bigness of the problem that is before the manufacturer who would open the greatest of fields—the Orient.

By Roy Alden

IN the great drives for trade being waged by American exporting manufacturers of automobiles, tires and kindred products, obstacles are being encountered in many sections of the world that will require systematic educational campaigns to eliminate. It is in China, Turkey, French Indo-China, Siam, India and elsewhere in the Near East and Far East—markets of immeasurable opportunities—that the educational campaigns should be centered, as it is here that human muscle is successfully resisting the motor vehicle as a mode of transportation.

While in the United States the motor truck is becoming the means of short haul transportation of everything from packages of hair pins purchased at the department store to loads of forest giants, across the oceans brawn is the chief agency of transportation. This is especially true in the Orient, where human muscle has for centuries been about the cheapest commodity money can buy.

When it is declared that the total number of motor vehicles in China and Japan combined do not exceed the number of automobiles that pass given busy corners on Fifth Avenue, New York, or State Street, Chicago, during an afternoon two-hour period, some conception of the tremendous potential demands for American automotive vehicles that exist in these two countries that hold within their confines nearly one-fourth of the population of the entire world can be gained.

These potential demands will become actual demands as soon as the Orientals are educated to an appreciation of what the motor vehicle means to their respective countries in the matter of development as well as to the individuals themselves in the betterment of their economic conditions.

A few months ago the writer visited Constantinople and there witnessed an example of how muscle, even down to the present day, has succeeded in keeping out modern methods of transportation.

In considering the *opposition of human muscle to automotive muscle*, however, several points must be taken into consideration in order to understand the situation clearly. In the Orient, flagrant ignorance of the value of motor vehicles is the chief cause why they are not used to any appreciable degree. But in the Near East, especially in Turkey, attention is drawn to an organization known as "hamals" or "porters." This organization draws its members from the motley population of the mystic Turkish city and European Turkey generally, and includes Greeks, Arabs, Bulgarians, Roumanians, Montenegrins, Turks, Egyptians, and a host of other nationalities.

The "hamals" of Turkey have acquired a tremendous influence in the business and commercial life of Turkey and they have bitterly fought the introduction of motor vehicles for purposes of transportation, not because they do not appreciate the worth of automotive transportation but because they do. They realize that if automobiles are imported to do the "carrying" they will lose their influence and their organization will crumble.

While it may seem almost inconceivable, this city of more than 1,000,000 people, which serves as the great distributing center for the upper Balkan nations and a portion of Asiatic Turkey, had virtually no trucks or commercial automobiles and not a single motor-driven, or even horse-driven, fire-fighting machine up to the time the armistice was signed. Even to-day, outside of the automobiles in military use, there is no appreciable number of motor vehicles in Turkey. *The power of the "hamals," although weakened somewhat, has not been broken.*

It is a common thing in Constantinople to walk along the main streets of the city, black with people of all nationalities, and see these "hamals" plodding along the street with immense loads on their backs. When a person goes to a furniture store, for instance, and selects a set of furniture and orders it delivered, no motor trucks back up to the rear of the furniture establishment, take on the load and make the delivery. *Not while the "hamals" continue to wield their undeniable influence.* The furniture dealer calls in some "hamals" from the district in which his place of business is located. If the pieces of furniture are light, such as chairs, they are fastened together and then roped on the back of a "hamal." If the pieces are heavy two or three or four "hamals" are employed, or possibly, but not generally, *an antiquated donkey-driven cart may be called in.*

Only if the purchaser of the furniture resides within a short radius of the store where the order was placed does the original "hamal" or "hamals" who first took on the load make the delivery direct. If the purchaser lives in another portion of Constantinople—and there are almost as many suburbs in Constantinople as there are avenues in the average American city—the load may *"change backs" a half a dozen times before it is finally delivered.* For instance, one "hamal" will take the load to the end of the district in which he is authorized *"to carry."* At this point he will transfer the load to the back of another *"hamal" who enjoys "rights" in the adjoining district.* And so on until the final delivery is made.

And all this, too, in a city of more than a million people in Continental Europe.

From Constantinople we penetrated to Constanza, the Black Sea port of Roumania, which is a day's run from the Turkish capital by steamer. Here are seen sacks of flour being swung from American steamers that were sent with their cargoes of food from the United States to relieve the acute situation. The flour is swung from steamer hold onto a quay. As there were virtually no covered docks the flour had to be transported a considerable distance to shelter. How was it transported? *On the backs of men!* Literally thousands upon thousands of sacks that made up the great cargoes were lifted one by one onto the backs of the Roumanian peasants, who trod wearily for blocks to the sheds to deposit their loads.

Unloading of the ships and placing of their cargoes in the sheds or warehouses that could have been accomplished with modern freight-handling facilities and motor trucks in two or three days required weeks. In justice to the Roumanians, however, it should be declared that the reason motor vehicles are not used extensively in that country is due more to a lack of initiative, energy and appreciation of automotive machines rather than a firm, selfish desire to adhere to antiquated ways.

The crying need for an educational campaign becomes emphasized. Facts, not flowery descriptive matter, need to be laid before this people. They must be told that motor trucks and commercial vehicles perform so much work in so much time at so much cost, as opposed to what human muscle performs.

It is difficult for Americans, living as we do in a whirlpool of automotive energy, to appreciate how antiquity still successfully opposes modernity in other climes. Reverting to the "hamals" of Turkey, we find them not only controlling the transportation system ashore and preventing the introduction of motor vehicles in any substantial numbers, *but they are found holding a powerful influence over the entire life of the city.* They are largely responsible for the fact that Constantinople, a port that in natural advantages has few equals in any other part of the world, *there is not a single dock to handle ocean-going vessels.*

All cargoes must be loaded or unloaded in the Bosphorus from or to lighters. And this, too, despite the fact that the Bosphorus is so deep that the largest vessels afloat can tie up alongside of almost any part of the European or Asiatic side of the famous waterway.

Lightermen and stevedores compose that species of "hamals" known as "porters." Just as their fellow foes of progress have a firm hold on affairs on terra firma, *so have the "porters" a strong hold on affairs afloat.* The material advantages that accrue to these "porters" by preventing the introduction of modern facilities is easy to appreciate. *All shipping is absolutely dependent upon their will.* Ships must bow to their will as to the length of time they will remain anchored in the harbor before their commercial missions are completed.

The ship on which the writer obtained passage waited nine days to take on a small cargo of tobacco, hides, Bulgarian opium, licorice, rugs and other articles that could have been loaded in less than a day in an American city with mechanical muscle.

Proceeding further east to the Far East similar conditions are found as regards the motor vehicle. In China, Japan, Indo-China, Federated Malay States and in other countries, colonies and dependencies in the Far East, there is hardly anything that can be acquired more cheaply than coolie muscle. Turned into American equivalents, *a coolie can be had all day for 20 or 30 cents.*

While it is not generally appreciated in this country, there is a movement on foot throughout the Far East that is of great significance and which will ultimately mean much to the American exporter of motor vehicles.

The movement is sponsored by the members of that great army of coolie laborers from China, French Indo-China and Malaya who went to France and worked behind the lines of the Allies. These thousands of members of the yellow race, after having passed through Canada, are now home again in their native soil. These returned soldiers of the Orient are different men than the soldiers that left China's shores years ago to answer the call to war. They have gained a wider perspective.

They have come to the realization that in other parts of the world human muscle takes a back seat to mechanical and motor muscle. They have breathed in an atmosphere of twentieth-century energy. And their eyes have set their cobwebby minds to thinking and an organization of returned Chinese soldiers has now been effected.

Keen observers of the situation in China, with its 400,000,000 people, declare that a new era has dawned in which the returned Chinese coolies are playing a highly important role. If cheap coolie labor can be eliminated in China—if the millions now engaged in carrying can be turned to production and constructive work and mechanical and automotive muscle replaces human muscle, China unquestionably will become one of the world's greatest nations.

And this movement, from the viewpoint of possibilities in foreign trade, holds greater opportunities to the American exporting manufacturer of motor vehicles than to the exporter of any other manufactured products. That the time is coming when motor trucks and delivery cars will do the work that is now being done on the backs of man is the conclusion of those who have watched the New Spirit of China.

American manufacturers of motor vehicles overlooked a great opportunity to hasten the acceptance of modernity by the great Chinese Republic when that great army of coolie laborers were hurried through Canada from France on their way home. While it may have been an unwieldy undertaking, there is no question but that there would have been remarkable results if these coolies were taken on a tour of some of America's leading industrial centers and shown how things are done in this day and age in a developed country. True, these coolies saw much and absorbed much during their term away from their native soil, but they should have been given an opportunity to have seen more.

It is not necessarily the leaders of business and commerce in China, Japan and other countries in the Far East that the Americans want to cater to in developing these countries as fertile markets for the motor vehicle. *Quite to the contrary, it is labor they must seek and educate, especially in China.* These are the persons who, by the cheapness of their muscle, are fighting the automobile. And, irrespective of what rising wages may mean in countries such as the United States, there can be no hesitancy in acclaiming the general advance in the cost of human muscle now taking place in the Orient.

A TEST recently made at McCook Field on Monel metal valves in a Liberty single cylinder engine tended to show that this metal is not satisfactory for airplane engine valves. In the tests the Monel metal exhaust valve failed at the end of 16 hours' running, the cause of the failure being excessive heat and mechanical stress on the exhaust side.

Effective Study of Aviation Hazards Begun

Preliminary reports by the Committee on Aviation Hazards of the National Safety Council outline definitely lines of study to be followed. Facts presented are of exceptional interest, since they embody the first comprehensive study of aviation hazards applied to civil as well as military flying.

THE future of commercial aviation depends, to a large extent, upon how safe flying can be made. The majority of people must become convinced of the comparative safety of air travel before they will utilize it as an every-day means of transportation.

Because the factor of safety is so important, special interest attaches to the work of the Committee on Aviation Hazards of the National Safety Council. The work of this committee comprises not only the compilation of accurate flying safety statistics compiled from past performances, but also the classification of the various types of accidents, the finding of their causes and the determination of means for eliminating them.

The committee was first appointed in May, 1919. Its efforts thus far have resulted chiefly in laying out very definitely the lines of activity which its work should follow, determining what factors of its task are most essential, and planning the best means of accomplishing the desired ends. This preliminary work is a stupendous task in itself since the field in which the committee functions is absolutely virgin soil; it contains practically no accurate guide posts by which the work may be directed.

Two reports have thus far been made by the first chairman of the committee, Frederick L. Hoffman, third vice-president and statistician of the Prudential Insurance Company of America. These reports are of exceptional interest, embodying as they do, the beginnings of the first important study of aviation hazards in this country as broadly applied to civil and commercial as well as military flying.

The first report begins with a statement of the problems and the natural divisions into which it falls.

"The subject divides itself, broadly, into (1) aviation for military and (2) aviation for commercial or private purposes. It is of the utmost importance that from the outset we secure the hearty co-operation of the government." Detailed suggestions follow concerning the civil and governmental agencies which should be consulted and asked to recommend men from their particular departments to serve on the committee. These agencies include:

1. Director of Military Aeronautics, U. S. Army.
2. Director of Naval Branch of Aviation.
3. Chairman, National Advisory Committee for Aeronautics.
4. Manufacturers' Aircraft Association.
5. Vice-president and general manager, Curtiss Aeroplane Co.
6. President, Dayton-Wright Aeroplane Co.

The report continues: "The questions the committee will have to deal with resolve themselves into:

1. A determining of the actual hazard in flying or degree of risk, comparable with occupational exposure in other dangerous employments.

2. The ascertainment of the causes or conditions responsible for accidents in aviation, whether fatal or non-fatal, as the case may be.
3. The prevention of such accidents in the light of all the knowledge now extant on the subject, both as concerns the plane or machine operated and the operators themselves."

The report then quotes from a treatise on the Air Medical Service as follows: "Flying itself is now just as prosaic and commonplace as riding in a motor car and not more dangerous. To consider that an aviator at the front is in greater danger than his brother in the trenches is ridiculous. Actual statistics prove that it is far safer in the air!"

In this connection the opinion of the chairman expressed recently in a letter to AUTOMOTIVE INDUSTRIES is of particular interest. "The matter (aviation hazards) is greatly in need of much more extended consideration if serious public apprehensions are to be avoided. You may have seen recent discussions as to the true rate of accident frequency in aviation, leading to totally different conclusions than the easy-going methods of the War Department as exhibited at least in the Air Medical Service."

The report itself contains suggestive statistics concerning flying safety gathered from different sources.

Special emphasis is laid upon the necessity for properly training pilots and for choosing proper pilots to begin with. This is regarded as one of the most important factors making for safety in flying. In one place the report says:

"Special care and attention are necessary in the selection of men for aviation service and it is, therefore, to be hoped that the committee will include at least one representative of Air Medical Service, so that all the essential facts bearing upon this aspect of the problem may be brought before the committee as a whole."

In the second report this point is emphasized again:

"As a question of the first importance, I would suggest for prompt consideration the whole problem of the qualified examination of civil aviators in accordance with the methods described in considerable detail by R. A. Bachmann, Surgeon U. S. Army, in the U. S. Naval Medical Bulletin. A reading of this publication, of which copies will be obtained for the information of the committee, indicates the urgency of thoroughly qualified examinations, it being well said that 'flying is a new science and new faculties are brought into play, the soundness of which must be determined in the applicant. In addition to physical fitness, the emotional apparatus must be tested.'"

The first report concludes as follows:

"The foregoing preliminary report will indicate in broad outlines the plan and scope of the work of the committee. If carried through with the required energy

and ability, the results should prove of a far-reaching value, not only to the public at large and in the furtherance of the development of commercial aviation, but also to the government in the perfection of the Air Service for military purposes. I, therefore, should make every effort to secure a thoroughly representative committee which, if it is desired, may choose its own new chairman, if my lack of technical qualifications should preclude adequate attention to the work."

Aside from the matter of proper selection of aviators, the chief recommendations of the second report are:

1. "The committee should leave nothing undone to develop sound ideas of aviation practice as a profession, and to discourage by all means the lamentable tendency to the needless assumption of serious risks.

2. "There should be a sub-committee on meteorology. Recent aviation experience has brought out more than ever the great practical importance of a full understanding of atmospheric conditions, laws of storms, etc.

3. "One of the most serious problems is efficiency of motive power. The best motor may prove unreliable.

4. "How far it would be possible to employ special safety precautions for both aviators and passengers is, of course, as yet an open question.... Suggestions are receiving an increasing amount of attention but evidently the subject is one of highly specialized consideration. A multitude of matters will require the attention of the sub-committee on safety in aviation but the work of such a committee should prove of the greatest possible value to those who wish to bring about an increasing sense of security in flying on the part of the general public.

5. "Concerning the practice of life insurance, which is, generally speaking, adverse to the acceptance of professional aviators except at practically prohibitive extra premium rates, it may be stated in this connection that thirty-one large British insurance companies have formed a pool known as the 'Aircraft Insurance Committee' with offices at 4 Thomas House, Queen St. Pl., E.A., London. Under the scheme worked out manufacturers will be able to effect insurance against the following risks:

- a—Damage to machines from any cause.
- b—Accidents to passengers and pilots.
- c—Loss of or damage to goods in transit.
- d—Liability of injury to the public or damage to public property.

The companies referred to transact chiefly accident liability insurance. It is hoped that an opportunity will present itself to the chairman to consider this matter during his forthcoming visit to England, and if possible, additional and official information will be secured and communicated to the members of the committee.

6. "There should be a sub-committee on public accidents, or accidents to passengers and bystanders. Without insisting upon unnecessary restrictions or rules and regulations, it would nevertheless seem a first duty of such a committee to inquire thoroughly into the whole question of safety precautions, chiefly for the protection of passengers as well as bystanders likely to suffer most from the hazard of inexperience and even reckless adventure.

7. "In conclusion, the question may be raised whether there should not be a sub-committee on the requirements of aeronautic instruments and the possible necessity for the compulsory use of wireless telegraphy on airplanes, dirigible balloons, etc., making long distance flights. This being a highly technical problem, someone recommended by the National Advisory Committee for Aeronautics should be invited to assume the chairmanship of a sub-committee on this particular subject, if it is decided to be called for by need of adequate protection of the public."

In furtherance of its plans, the original committee sent

out letters of invitation to a number of representative experts connected with aviation interests. The essential portion of the letter reads:

"Upon preliminary consideration, we have agreed to divide the general industry into:

1. Accident liability of operators; due to
 - a—Lack of proper training; inexperience or want of skill; and, a disregard to the suggestions disclosed by the Air Medical Service; and
 - b—Recklessness or foolhardiness.
2. Accident liability resulting from defects in machine construction; due to
 - a—Faulty technique of manufacture;
 - b—Neglect of proper repairs or attention to weak points in construction;
 - c—Defects of motor power; faulty engine construction, etc.
3. Accident liability of passengers, due to
 - a—Improper care, seating arrangements, etc.; or
 - b—Want of physical adaptation to variations in altitude which would require a due consideration of questions of altitude physiology.
4. Accident liability of the operators and mechanics on the ground; due to
 - a—Disregard of proper safety precautions, both concerning the operator and the bystander.
5. Accident liability; due to
 - a—Inherent natural causes such as unusual weather conditions, want of knowledge of air variations, etc.;
 - b—Neglect of the use of the radio apparatus, etc.
6. Accident liability resulting from general causes, not covered by the foregoing enumeration, including the tendency to foolhardiness and recklessness as best illustrated by the recent phenomenon of 'an example of how fliers risk their lives to thrill crowds' in which Lieutenants Elliot and Short were reported to have done 'some sky vaudeville to amuse thousands of spectators at Sheepshead Bay.'

"This division of the work should include the neglect to employ safety precautions such as the use of parachutes, etc., and the neglect of exceptional precautions in the case of unusual altitude flights."

Replies to these communications indicate that the fullest co-operation will be accorded in each case.

The preceding digest of this important report reviews only briefly some of the salient points likely to be of most interest to the automotive industry. The full text of the report will be available in the Annual Proceedings of the National Safety Council about March, 1921.

THE Danish Air Traffic Co., after protracted preparatory work, was able to start regular traffic recently, the Danish Ministry of Public Works having sanctioned the conditions of the program. The commencement was made with a Friedrichshafen machine, starting from the seaplane station of the Royal Dockyard, Copenhagen, and the first route to be worked is Copenhagen-Berlin, with an intermediate stoppage at Malmo, Sweden, and a change at Warnemünde to the aeroplane for Berlin. The fare per passenger is 400 kr. from Copenhagen to Warnemünde. Until the route Copenhagen-London is opened there will also be a change at Warnemünde for Hamburg. The Copenhagen-London route will be opened shortly and four De Havilland machines, which are expected to arrive from England in the near future, are intended for this traffic, going as far as Hamburg. On the Copenhagen-Berlin route some five seaplanes are engaged and flights will be made daily whether passengers travel or not.

Factory Service Managers Admit an Obligation to Owner

The service problem appears to be practically settled in many factories, as in a recent convention many managers let it be known that the satisfied owner is the objective of their work. Move to make tool rolls of some use to owner. Uniform size instruction books for cars, parts and accessories.

By J. Howard Pile*

WITH a realization that service to the car and truck owner is going to play a very important part in sales, factory service managers met in convention at the Hotel Cleveland, Cleveland, for the third time since the conclusion of the war and discussed problems relating to training, education, distribution of parts and better co-operation from the factory service department down to the sub-dealer.

The thought that seemed to be uppermost in the minds of all was that the owner must be satisfied and that it was of little consequence what methods or systems are used as long as the results are satisfactory.

The first two days of the convention were given over to business sessions and the third day to visits to local factories and service departments.

A. B. Cumber, General Service Manager of the Autocar Co., was chairman of the meetings and H. R. Cobleigh, Service Secretary of the National Automobile Chamber of Commerce, handled the business of the meeting.

The outstanding feature of all the talks was that the factory had a real responsibility in service to the owner, even though the factory does not enter directly into it. It can no longer be said that the distributor, dealer or sub-dealer is responsible because he gets part of the discount, because if these agencies fall down on the job, the owner is dissatisfied and sales will fall down. It therefore becomes the duty of the factory service department to see that the right kind of service is given, handling this preferably through the distributor rather than directly with the agency at fault. Special tools, policies affecting the distribution of parts for components and accessories, maximum and minimum stocks and training of personnel all assist the direct service agencies and were the principal topics of discussion.

In his opening address George C. Hubbs, vice-president of the Grant Motor Car Co., said that treating the car owners and car drivers with courtesy was of greater importance even than correctly repairing the cars. He was of the opinion that there was more dissatisfaction with service because the owner was not properly sold than there was with real complaints about poor quality work.

Hubbs said that the average service manager was more involved with systems than with the actual education of the owners and of the mechanics in his employ. He was of the opinion that the service manager should be an assistant both to the sales manager and to the chief engineer. The service manager should be capable of formu-

lating policies of such magnitude that even the policies of the smallest dealer would be an exact reflection of the policies of the factory.

The attention of the delegates was called to the constantly increasing traffic, especially in the large centers, and it was suggested that the convention take some action on the uniform traffic signals which have already been approved by other national organizations. The uniform signals are:

Hand below horizontal, turn to left.

Hand horizontal, stop or caution.

Hand above horizontal, turn to right.

By a vote the convention decided to adopt this code and to use every means to extend its use.

F. J. Wells, Service Manager of the Pierce-Arrow Motor Car Co., spoke on the training of men for executive positions in local service departments. He said that his firm was training about 50 such men a year and that the results had been very satisfactory. These positions range from service managers down to foremen and the cost to educate a foreman runs around \$700. He said that about 85 per cent of the men so trained stayed with Pierce-Arrow.

G. W. C. Braithwaite, service manager of the Apperson Bros. Automobile Co., read a paper entitled "How to Improve Passenger Car Service," in which he pointed out a number of instances in which he, on a trip, had been unable to get either the parts that he wanted or the service that he needed from local service stations. He pointed out that while it was highly desirable to give all possible assistance to authorized service stations, yet it was quite impossible to have these so widely distributed that the owner would be near one if he needed service. He said that most owners were inconsiderate enough to break down a good distance from an authorized service station and therefore the independent garage was called on to perform the work. As it has not generally been the custom in the past to take any notice of the garage, the parts are not usually at hand and the garage does not know how to perform the work sometimes.

Braithwaite praised the automobile business papers for the assistance they had been to these independent repair men in furnishing information when the factories did not seem to be alive to the possibilities of co-operation.

L. C. Voyles of the Marmon said that service must be put on a merchandising basis. He said that if you went into a store to buy a hat, the salesman stepped out with a smile and tried his best to sell the hat, his service and

*Technical Editor *Motor World*.

the reputation of his house, but when a man came in with a car to be fixed too often the service salesman sauntered down with an air of "What in the hell are you doing around here again?"

The question of service hours was brought up, it having been suggested that automotive vehicles are in direct competition with steam and electric trains which render a 24-hour service, and it was therefore almost a necessity to give this same kind of service to the car and truck owner because he is using his vehicle considerably over the 8-hour period.

Paul Williams, Service Manager of the H. H. Franklin Mfg. Co., said that a considerable problem in the past had been the preparation of special tools for repair work. Ten months ago his company had engaged a tool maker, who is devoting his time exclusively to this problem. The tools have been carefully worked out in practice, and Williams estimates that a full set, aside from the engine running-in stand, should cost about \$100.

Discussion on this paper brought out the statement that the tool rolls supplied with most cars are almost worthless, that the wrenches do not fit the bolts and nuts and in general the tools are of poor quality. This was generally agreed to, although some said that the trouble had been remedied by asking officials of the company to try to use the tools.

There seems to have been a considerable change of mind in the matter of responsibility in connection with parts and service for parts and accessories not covered by the factory warranty. It had been previously held that the manufacturer of the part was responsible for both the parts and the service.

Now, however, with the satisfaction of the car owner more to the front, the managers generally agreed that the car or truck service departments should take care of the owner unless the parts manufacturer had better facilities at hand to give the owner better service.

Instruction and parts books came in for a lot of criticism and discussion. Some were not in favor of furnishing parts price lists to the owner, others contrary. With the constantly increasing number of parts and instruction books issued by component and accessory manufacturers, it becomes increasingly difficult for the owner to keep these together.

It was therefore agreed that in future instruction books there should be a uniform size of 6 x 9 in., and that a committee should be appointed to meet with a committee of the Motor and Accessory Manufacturers' Association to see if the accessory makers would also conform to this size, and then the books could all be punched and bound together in loose-leaf form.

Stolen cars and their relation to the service department was ably handled by E. L. Ricards, manager of the Western Automobile Underwriters' Conference, who said that one of the greatest difficulties that his organization had to contend with was the impossibility of identifying cars after the serial number had been altered. He said that in many cases the numbers on the components remained unaltered, but the factory assembly records were not arranged so that, knowing the number of any part, the serial number could be ascertained. Secret numbers and cross references for parts numbers were suggested as a relief for this situation, and it was pointed out that this would be of great value to the car owner and therefore a sales argument. He also said that in the new ratings now being made up a reduction in premium would be allowed on cars which could be identified in this way.

Buffalo has been selected as the next convention city and the time of the convention was set for May. It was decided to have this a closed meeting for factory service managers, but provision has been made to accommodate a few who are not in this class but interested in the work.

Bad Garage Service in the United Kingdom

LONDON, Oct. 29.

JUST now there is an outcry in the *Harmsworth Times* and *Daily Mail* concerning poor garage service in England, though probably the rest of the United Kingdom is meant to be included. The complaints may be cited as follows: Dirty and ill-equipped premises; slovenly, careless and indifferent service; overcharging and a general lack of business oversight.

The most serious aspect of these complaints is that they are leveled specially at the garage "mechanics," the men who might be supposed to have benefited by war training, etc. But this class is roundly being blamed in all sections of industry, some regarding it as revolutionary and prone to idleness. As regards the immediate issue, two other factors are to be noted:

1. The effect of Ford service is beginning to be realized and noted in this country, Fords having insisted on, and being in, an unchallengeable position to compel their dealers even to build and equip separate premises and carry stocks, and otherwise to conform to the company's service ideals. Other American firms are tentatively following suit, but of course they are very few and their sales are not sufficient to set up the exacting standards of Ford.

A few British car makers have traveling inspectors who periodically visit customers and examine and report on their cars and indirectly are able to note the quality of local garage service. This sort of manufacturer ser-

vice at present is limited to the more expensive makes of cars, but seems likely to develop if only as an antidote to American enterprise in our midst.

2. To blame the garages and garage "mechanics" is not fair unless the manufacturers also are included in the survey, e.g.:

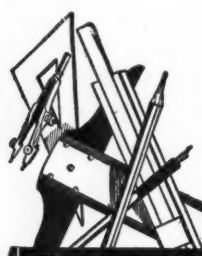
(a) As regards the uncommercial designs of some makes which are not suitable for ordinary mechanics to deal with—and this remark applies more to the cheaper cars of the sort mostly owner-driven, and

(b) A lack of really useful instruction books which would enable any mechanic to grasp the layout of (to him) unfamiliar cars, and

(c) Lack of standardization is a factor responsible for very much unnecessary delay on various scores.

The most that can be expected from a country garage is "service" by way of clean accommodation for cars, facilities for small repairs to, and changing of tires and wheels or rims, gasoline and oil supplies and ability to cope with some small breakdown such as done by blacksmiths in the case of farm implements, etc.

The attention of the dealers' organization—the Motor Trade Association—is being constantly called to this need, but it seems likely that it will only be satisfied by the two associations of motorists—the Royal Automobile Club and the A. A.—both of which have well filled coffers—taking up the issue and seeing it through. Meanwhile Ford is reaping a harvest on this as on other scores.



The FORUM



Prosperity and the Patent Office

Editor AUTOMOTIVE INDUSTRIES:

Except for the uplifting influence of our badly starved churches and schools; and except for the great natural wealth of water and woods, field and mine—wealth beyond that of any other nation, inequitably distributed though it is; no one thing has contributed so much to the wonderful progress of our land and to its influence on the world during the last century as has our Patent Office.

Our liberal patent laws have held before every one the promise of a reward for every development of value, and no taxes have destroyed this promise, as happens in foreign lands. As a result, the inventions of American inventors have broken all records both in number and value. No other nation can point to so many epoch-making devices. Originated here, they are too often developed elsewhere and now are adding wealth to all nations often without credit to the original inventor. Further our Patent Office is the only Government Department that is more than self supporting and it to-day has nearly \$10,000,000 of earnings taken for services not fully rendered and held by the United States Treasury only to be used by appropriation of Congress.

For a generation every Commissioner of Patents has begged that some of this money might be used to furnish better quarters, more just salaries and improvements demanded by conditions not easily told. Except in providing a more equitable and elastic money system, there is no place where a slight intelligent action by Congress can produce so great advantage and every business man, whether employer or employed, is interested in seeing the needed action taken.

"Better Patent Service" should be the slogan and a more certain reward for invention its object. The present building is far too small for the business which has grown by leaps and bounds. From garret to cellar it is crowded with people and papers. Workers and their desks bump against each other. Ill-lighted, ill-ventilated and unsanitary is a mild characterization of the conditions. Wooden shelving lines the walls; wooden cases fill the open spaces and all are crowded to overflowing with copies of patents. On these dust gathers until the remedy would seem to be an application to the Board of Health. Can it be otherwise? Go and see.

Twice the Patent Office has suffered from fire and to-day it stands a perfect invitation to another and more disastrous conflagration. The loss to the land would be incalculable. Yet the great majority of our people imagine that the matter only concerns "a lot of inventors who are mostly crazy anyhow." And Congress, reflecting the views of the voters, spends our money in junket trips to the Orient and other ways of slight value to us.

Next consider the workers there. The salaries paid are so inadequate that the minute a man becomes really efficient he is offered far more by some corporation or can make more by becoming a patent solicitor for himself. Only altruistic self sacrifice, as shown by our preachers, and teachers, and love of the work holds the better men. The empty places are filled as fast as possible by bright

young college graduates, well meaning but lacking in experience and too often unable to grasp the advances made by the brainy men who constitute our inventors. The result is defective patents, and great increase in legal suits to get justice.

Finally nearly one-third of our patents are out of print and copies cannot be obtained by business men needing them. These things can be and should be promptly remedied. This is the time to stimulate invention and make more business. The welfare of our land demands it. More certain rewards should be offered the inventor and the best of facilities should be offered him to protect that which he dedicates to the public. Congress will act if the people demand it. Now is the time.

CHARLES E. DURYEA.

Cam Arrangements of Radial Aviation Engines

Editor AUTOMOTIVE INDUSTRIES:

In the interesting description of the Cosmos nine-cylinder radial engine, which appeared in the Engineering Issue of AUTOMOTIVE INDUSTRIES dated June 10, 1920, it was stated that there were three cams on a single plate for operating the inlet valves, and a similar arrangement for operating the exhaust valves. Now, if this were the case, the valves of cylinders Nos. 1, 4 and 7 would all open at once, and so this arrangement would not be successful. In the drawing there are four inlet and four exhaust cams. Radial engines of the nine-cylinder four-cycle type fire 1, 3, 5, 7, 9, 2, 4, 6, 8. The crank turns through 80 deg. between explosions. If a cam plate having four points were used, this should travel 10 deg. while the crank pin was traveling 80 deg. (in the opposite direction) or one-eighth as fast. In the description it was said that the plates were driven at one-sixth engine speed.

Another arrangement would be to have a five-point cam running at one-tenth engine speed in the same direction as the crankshaft. As the points are 72 deg. apart, the cam must travel 8 deg. while the crank pin is traveling 80 deg., or one-tenth as fast. If the tappets for the inlet valves are staggered, and not in the same plane, other arrangements are possible.

If a circle is drawn having nine radial lines equally spaced to represent the cylinders, the correct cam arrangements may be easily determined by the use of figures of cams, with different numbers of points, cut out of pasteboard. The cam should revolve upon a pin stuck into the center of the circle. It must be remembered that the engine fires every 80 deg. and not every 40 deg. It will be found that 2-point, 3-point, and 6-point cams cannot be used.

In the case of three-cylinder radial engines a 2-point cam running at one-fourth engine speed in the same direction as the crankshaft may be used. For five-cylinder engines (explosions every 144 deg.) a 3-point cam plate running at one-sixth crankshaft speed in the same direction may be employed; or a 2-point cam running at one-fourth crankshaft speed in the opposite direction may be

used. If a 4-point cam is used cylinder No. 2 would fire before No. 3, if the cam ran in the opposite direction as the crankshaft. When cam plates having a large number of points are used, the reduction must be very great, requiring complicated distribution gearing. Also, the expense of making the cam is greater.

DONOVAN E. SHUMARD.

Chassis-Testing Dynamometers

Editor, AUTOMOTIVE INDUSTRIES:

In the October 28th issue of AUTOMOTIVE INDUSTRIES an illustration is shown of a Hispano-Suiza chassis in test with Froude brakes, and the statement is made that this installation is the only one of its kind in France and the second to be delivered to an automobile manufacturer, the first having gone to the Daimler Co. at Coventry.

This may be the first installation in Europe of a chassis test system using brakes connected with the rear

wheels, but it is by no means the first installation of a mechanical chassis test system employing dynamometers.

Electric cradle dynamometers, driven from the rear axles by silent chains, were installed by the Cadillac Co., in Detroit, in 1912, and are in daily use at the present time. This installation has been followed by many others.

As far back as 1914, a water-brake installation not unlike that shown in the drawing, but arranged for chain drive instead of direct coupling, was in use by Cole in Indianapolis.

Preparations are now being made to install an electric chassis test dynamometer system by one of the big British firms.

C. F. SCOTT.

(The first chassis testing dynamometer in this country was installed at the A. C. A. clubhouse, New York, in 1907. Somewhat later such testing plants were installed at the Worcester Polytechnic Institute. The Speedwell Motor Car Co. of Dayton, Ohio, was one of the first concerns to install chassis testing sets.—Editor.)

Duesenberg Car Has "Straight Eight" Engine

(Continued from page 1009)

doubtedly due to the difficulty of designing a simple and efficient mechanism for conveying the brake actuating motion to the pivoted front wheel brakes. Duesenberg has gotten around this difficulty by adopting an hydraulic system of actuation. These brakes are foot-actuated, in accordance with the regular practice, but the motion of the brake pedal, instead of being transmitted to the brakes by a direct mechanical linkage, is transmitted by columns of oil under pressure.

It may be of interest to point out in this connection that a similar system of transmitting motion was successfully used in the C. C. or Canstantinesco machine gun actuating mechanism during the war. On the main cross member, at the middle of the chassis, a master cylinder is provided containing a leather cup type of piston, the space behind which is filled with oil. This master cylinder is pivoted to the frame at its closed end, and the piston rod connects through a link with a frame bracket below the cylinder. From the pivot joint between the piston rod and the link a short rod extends forward to the brake pedal, the arrangement of this link mechanism being such that a toggle effect is produced when the brake pedal is depressed.

From the closed end of the master cylinder, oil distributing lines extend to the brakes at the four wheels, these lines consisting partly of seamless steel tubing and partly of flexible tubing. The lines to the rear brakes extend most of the way along the diagonal brace rods of the rear axle, and are therefore inconspicuous and well supported. The lines to the front wheel brakes extend for a certain distance along the frame side members, and the rest of the distance parallel with the front springs, which location affords a certain amount of protection to the lines. The latter part of the oil leads to the front wheel brakes, is machined in the axle end forging, and there is a swivel pipe connection at the upper end of these forgings, which does away with the necessity for exposed flexible tubing.

The general arrangement of the hydraulically operated brake is quite clear from the accompanying illustration. The brake drums, which are 15 in. in diameter, with an effective width of $2\frac{1}{4}$ in., are made by the rolling process and are cut with cooling ribs on the outside, in accordance with a custom that originated in racing practice. The brakes are of the expanding type, and the two sectors are pivoted on a stud projecting laterally from a post or

column extending down from the axle end forging. The upper ends of these brake sectors are connected together by the hydraulic cylinder and piston combination. As the hydraulic cylinder of the brake has a slight motion relative to the steering knuckle, it is necessary to use a flexible tube of sufficient length to prevent undue strain by bending in applying the brakes. The motion of the free end of this flexible tubing is the same for the front and rear brakes and does not exceed $\frac{1}{4}$ in. The brakes, of course, are fully enclosed. The oil is conducted through the steering pivot which it leaves through the swivel joint on top, then through a bent piece of steel tubing to a fitting secured to the side of the knuckle, and thence up to the hydraulic cylinder through the flexible tube.

When pressure is applied to the brake pedal, oil is forced from the master cylinder through the pipe lines to all four brake cylinders, and the brake sectors are applied to the internal surfaces of the brake drums with great force. As soon as the pressure on the brake pedal is released, the return springs withdraw the brake sectors from the brake drum. This hydraulic system for the transmission of brake actuating pressure not only does away with a multitude of links and levers, but also equally distributes the braking work between the four brakes.

In addition to the hydraulically actuated service brakes, there is an emergency brake which is mounted on the front end of the propeller shaft, rather than on the rear end of the transmission, and therefore relieves the fabric universal joints of the braking strain.

The new Duesenberg straight eight has a wheelbase of 134 in. and when fitted with a 4 or 5 passenger aluminum body weighs in the neighborhood of 3100 lb. Special pains have been taken in the design to keep the weight of the complete car as low as possible, and aluminum parts are used very extensively. Thus, the dash and the foot board are aluminum castings, as is the radiator shell. In the model shown at the Salon there is no continuous runningboard, but instead there are cast aluminum steps at the front and rear doors. The fender irons, which also support the headlights, are made of sheet steel, the headlight brackets being tied together by a tubular tie rod in such a manner as to practically remove all strain from the headlight shells. The wheel equipment is Rudge-Whitworth, with $33 \times 4\frac{1}{2}$ in. oversize cord tires.

A Definition of "Open Shop" Necessary for Present Discussion

Many manufacturers and labor leaders are to-day discussing the "open shop" tendency, but their public utterances indicate that not all are agreed as to what they have in mind. In this article a definition is offered that may eliminate some of the fighting spirit and misunderstanding prevalent

By Harry Tipper

THERE are evidences of a movement in manufacturing circles toward what is being termed the open shop, and this movement is having encouragement from a great many thoughtful manufacturers, who are disturbed by the actions of labor organizations and see no hope of a solution through their activities.

Before this movement gets very far under way it would be well for the term to be defined so that not only the manufacturers in general, but the public and the worker will understand what is meant by the open shop.

This term does not have the same meaning in the minds of different men. In the minds of many workers, and some manufacturers also, an open shop simply means a factory where the non-union man is welcomed and the union man is ostracized. In the minds of a good many workers, and in the minds of a good many manufacturers, the term open shop means a shop which does not recognize the union organizations at all, but which in other respects is closed.

The use of this term in recent speeches by many men of different habits of mind indicates again the general tendency we have to label a thing without defining that which we are labeling and therefore confining the label to the exact proposition we are talking about. There is no doubt that the labor union as it is at present constituted, is incapable of solving the present industrial difficulties, and in some respects under certain types of leadership, it is likely to perpetuate the differences instead of solving them. It is also true that strict justice demands that any worker who is competent in performing the work for which he is hired has a right to the opportunities of work without respect to his affiliations or his individual influence toward labor organizations.

In a good many of the statements which have been made, however, the inference is that the open shop is a back-fire against the growth of unionism, and is justified as such.

It would be very unfortunate to have this spirit enter into the controversies and the action, because it would destroy the true value and the possibilities of the open shop and would militate against many of the wise experiments which are being conducted in the endeavor to increase the co-operative unit in the establishment.

The manufacturer says truly, that the labor union should not be permitted to coerce the worker into joining a union by demanding the closing of the factory doors to all men who are not members thereto.

It will not aid the solution of the matter, however, if the worker is permitted to get the idea that the open shop movement is a coercion against the union with no

more freedom of action for the worker and with a larger element of control by the manufacturer. It must be remembered that a very large percentage of the workers who are members of unions are reasonably sane men who do not agree with the actions of the unions by any means at all times, and who resent the autocratic control and coercive spirit which characterizes many of the unions in their development and their practice.

To these men as to all other workers, an open shop development founded on a greater measure of justice than the unions have ever conceived, founded upon square dealing between employer and employee without respect to their personal ideas, their outside affiliations or their racial inheritance; a shop open not only to all workers, but open and above board in its decent consideration of the worker about his wages, the conditions of his work and the rules and regulations under which he must work—such an open shop would be a step far in advance in the solution of the present industrial difficulties and the establishment of the factory as a truly co-operative unit working out the problems of its own necessities.

A shop of this kind will find its adherents coming from the ranks of the unions in greater proportions than they come from the ranks outside of the unions. No union will ever be able to catch up to this kind of a shop, because it would be so far ahead of the unions in its conception of justice and its operations of the square deal that the union would be incapable of advancing to the same point.

Unless the open shop policy is to mean this sort of development, however, it will be futile except as a temporary measure and it will ultimately fail as an element in the permanent solution of the problem.

Labor leaders, walking delegates, young restless workers, intelligent and discontented workers of all kinds and natural organizers will not see the labor unions or other labor organizations eliminated from their shop control without the utmost attempt to hold them in line and await a more favorable opportunity.

That labor leaders are ready to sense these things is indicated by the following quotation from a union president to the members of his organization:

"This is not the time to listen to anyone who advocates hasty, intemperate or ill-considered action, for the factories will not be laying off workers forever or be slack all the time. They will get busy one of these days and when they do we must be ready to repair any damage done."

The last sentence is the important part of this quotation, indicating that the labor organizations recognize

the difficulty of the present situation for the unions. the necessity for quiet and careful development of their plans under such conditions or rather marking-time until a more favorable opportunity arises.

Organization development of this kind will not be stopped permanently by the mere starting of an open shop plan without any qualifications as to what the open shop means and without a sharp definition being drawn between the desire to destroy the union and the demand for equal conditions of work for all workers. **No progress was ever made by taking the negative side of the situation only, and placing the emphasis of the campaign upon that.** The only value of the negative is to draw from its consideration the positive improvement which can be secured by correction of the present difficulties.

The statements which have been made in the last few months regarding the open shop and which have come from the manufacturers' side, have emphasized the deficiencies of the union development and absurdity of the union position on these matters, but have not sufficiently stressed the positive position which must be taken in order to make an open shop policy successful.

If I suspected a man of trying to put something over on me, and he objected to the actions I had taken for my own protection as unjust, such objection would not be likely to decrease my suspicion unless he had positive evidence to offer that he was attempting to deal fairly with me and that he had a better plan to suggest.

Most of the workers know little or nothing of the manufacturers' plans, or policies, or desires. Most of them are suspicious of the manufacturers' motives and a very large number of them regard the union as their means of protection from the manufacturer.

Under these circumstances the objection of the manufacturer to the closed shop and his stated preference for the open shop without any definition of what he means, or any program of action which has a positive suggestion of improvement, is likely to increase the suspicion and the disagreement without offering any possibilities of permanent solution.

It will be very much better if there were less talk about the open shop and more careful study of its necessities and possibilities. As was stated in the beginning

of this article the open shop, that is, the shop where every man competent to do his work has the same opportunity to exercise his skill without respect to his organization affiliations outside, if conducted with justice and understanding, offers the greatest hope of manufacturing unity and the co-operation of labor, management and capital in the working out of his problems. This is so because such a shop would be humanly so far ahead of the union organization that it would offer an incentive and an opportunity to the workers that are not contemplated under any present union condition. If such shops were established in a sufficient number of cases, and if more of them were started, there would not be much necessity to make an outcry about the open shop or the closed shop, because the tendency would be sharply defined and the advantage definitely shown.

It is a poor way to start reorganization by degrading a possible improvement into a fighting term to neglect the positive opportunity in favor of negative reaction against deficiency. The progress toward a real permanent unified open shop will not be aided materially by those who are talking about it as a means of combating union influence to-day and whose remarks particularly show more vehemence than discretion in their approach to the problem.

If possible, it is to be hoped that we can approach the human side of industry so that it will be unnecessary for us to arrive at the highly organized condition exhibited in a country like Great Britain.

The solution of our difficulties will be secured much more rapidly and difficulties themselves will be much less if we can avoid that condition. That condition will not be avoided, however, by continuing the emphasis on the fighting side of the situation and losing the opportunity to emphasize the improvement side of the situation, which is to be gathered quite easily from the experiments that have been conducted so far.

The open shop is a better industrial condition than the closed shop, in some cases. In other cases, it is worse and the difference is entirely in the character of the shop and the measure of justice and understanding which has gone toward building it.

Novelties Are Prominent at the Automobile Salon

(Continued from page 1006)

in Spanish leather, and a one-piece windshield is fitted.

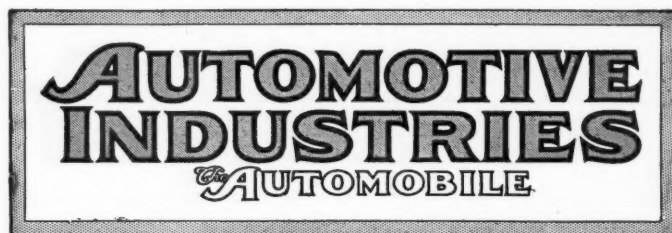
Another type of body shown is the suburban sedan with a landaulet type of body. This has doors inlaid with mahogany, and all windows can be completely lowered so the top of the glass comes down flush with the window sill.

On the Winton stand is shown a new standard sport model, a four-passenger car, built on the regular Winton 33 chassis with a six-cylinder $3\frac{3}{4} \times 5\frac{1}{4}$ in. engine. There is a storage compartment in the rear of the front seat. Two spare wheels are carried on the sides in front. Disk steel wheels are fitted. The windshield is a one-piece type, while other equipment is the same as on the Winton touring cars. The steering wheel is dropped about 3 in. as compared with the Winton touring model. In the Winton four-passenger sedan the rear deck has been replaced by a trunk carrier.

On the Cunningham stand is shown the model V-4 which is now fitted with Delco electric equipment. The rear spring has been increased in length to 62 in. Oil cups of the snap cover type are substituted for grease cups throughout the chassis. A thermostat is now incorporated in the cooling system, being inserted in the water inlet

to the cylinder jacket. The Cunningham exhibit features a 4-passenger chassis, which is guaranteed to develop a speed of 80 m.p.h. with regular equipment. This is the same chassis as used by Ralph De Palma in speed trials at Sheepshead Bay, in which he broke several world's records. The individual step and sod pan construction is continued by Cunningham.

In the Brooks-Ostruk exhibit is shown a sport body designed for four passengers. This model has individual front seats, which tilt forward to allow of free entrance to the rear seats. Single doors on both sides serve for entrance to both the front and rear seats. The body is made of crowned aluminum, the sides being concave toward the outside, and a curved bevel edge running along the top and around the rear. Spare tires are carried in front. The fuel tank is located at the rear, and is protected by mahogany slats. A California type of top is fitted, with a single oval plate window in the rear. The running boards are of mahogany, with longitudinal slots cut into them in which are inserted wavy metal strips, while corrugated metal strips are secured to the top of the runningboard.



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Automotive Industries—The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly), July, 1907, and The Horseless Age (semi-monthly) May, 1918.

Contracts and Prices

THE present situation as to price adjustment has brought into prominence the meaning of a sales contract. It apparently has been the practice in America of considering an order merely as a memorandum of intent and the persons most concerned holding a mental reservation that they can cancel or delay as they may see fit, according to the drift of trade.

This situation is now working hardships on many parts makers in the automotive field. The car manufacturer has decided to cut the price of his product, and he expects the parts maker to share his reduction. Perhaps it is right that he hold this expectation, but is it right that he should cancel his contract with the parts maker because the latter does not immediately lower his price?

The parts maker, in many cases, has contracted for materials on a basis of the price agreed upon. In some cases they have large quantities of parts manufactured and are holding them for delivery when

called for. These men should at least be given a hearing as to whether they can reduce their prices without a loss.

Whatever may be the legality of a sales contract, it implies a moral obligation not to destroy the other party to it, if that can be avoided.

In the meantime trade associations would do well to give to this important factor some consideration and establish a sales contract that is equitable and stable. In England, a sales contract is a banking document.

Anticipate Demands for Parts

THE sales manager of one of the largest automotive parts concerns said the other day that it would take his plant ninety days to get back into anything like normal production when business picks up again. This statement may well cause some thought on the part of automobile manufacturers.

When the business slump started, the dealers felt the effects first, then the manufacturers and finally the parts makers. As business picks up again, the order will be the same. The dealers are already beginning to feel the effects of business revival; the parts makers will be the last to get the benefits.

But the automobile manufacturers, in order to play fair with the parts makers, must strive their utmost to look ahead, to anticipate their needs, and to place their orders far enough in advance so that the parts makers can have a reasonable opportunity to get back into production. Some of the parts makers feel that they are "holding the bag" to a large extent at present. Sudden demands should not be made of them when business revives; they cannot be expected to fill reinstated orders on a week's notice.

Many of the parts manufacturers are making a strenuous effort to keep their organizations in such shape that it can quickly be brought back to normal. The firm quoted above, for instance, expresses no sympathy with the movement among some manufacturers to reduce sales promotion effort and advertising during this time of business depression.

The sales efforts of this firm are being increased rather than curtailed upon the logical basis that sales effort is most necessary when business is lacking. This sales manager said as well, "To keep on top of your customers' changes and requirements at the present time means the exercising of greater care than ever before. All records must be kept exactly and changes on orders and shipping schedules made accurately and as quickly as received.

"... In all plants that are working on short time there are certain members of the factory organization who must be retained because it is cheaper to hold them than to let them go and endeavor to replace them when things brighten up. A sales organization should be able, and in fact must be able, to direct the production of parts which, if they cannot be shipped at present, are going to be most in demand when orders are forthcoming at a future date.

"It seems to me that the present time gives a sales organization a wonderful opportunity to show itself."

These statements are, of course, a strong plea for

the employment of more, rather than less, powerful force in sales promotion effort at the present time.

They indicate as well, however, the strenuous efforts being made by one parts maker to keep in touch with the prospective needs of his customers, to anticipate what their demands will be, so that he will be able to supply them on the shortest possible notice when business picks up.

Such efforts as this are deserving of the heartiest co-operation from the automobile manufacturer. He can render such co-operation by studying his own prospective needs, anticipating them insofar as possible, and giving the parts maker a reasonable chance to get back into production in time to fill those needs.

The Question of Overgeared Fourth Speeds

THE opinion has repeatedly been expressed that, in order to make it possible to get along with smaller engines on passenger cars and thus save on fuel, it may be found desirable to return to the four-speed gear, and in this connection the question was raised recently whether in this gear the direct drive should be on fourth or on third.

There is no doubt that on a car which is being provided with a four-speed gear with a view to fuel economy the direct drive should be on fourth speed. When four-speed gears were designed with an overgeared fourth the reasoning was that the owner occasionally would want to get out of the car on good level roads all the speed that could reasonably be expected, having regard to the size of the engine and the weight of the chassis (as, for instance, when a neighbor with a new car came up behind and gave the signal for you to clear the road). This called for one relatively small gear reduction between engine and rear axle. But if the final drive reduction was made small so that the direct drive gave the desired high speed, then the direct gear could not be used on grades of any importance, on fairly heavy roads and in traffic. In other words, it would be necessary to do much of the driving on the lower gears. The lower gears usually are somewhat noisy, and on the whole noise is more objectionable when going slowly than when going fast. Therefore, the geared-up fourth transmission was a happy solution of the problem presented by the prospect who desired a reserve of speed for special occasions, but who mostly would want to drive at moderate speeds and do as much of his driving as possible on the direct gear.

In the economy car we have to cut out right from the start any idea of incorporating features that will enable you to "trim your neighbor." Of course, it is also impossible to drive "on high" practically all the time and secure economy. The driving will have to be more nearly equally distributed among the different gears than is at present the case. The reductions can always be so proportioned, however, that the high speed is in use a greater proportion of the time than any of the other gears. From a fuel economy standpoint it is always advantageous to use the highest gear possible, provided it does not pull the engine

down to a speed where it runs unsteadily and begins to knock. Therefore, the highest gear should be used as much as possible and this makes it desirable to make this the direct drive.

There is an objection to an overgeared fourth, in that it is practically impossible to make the gears run quietly, on account of their necessarily high pitch line velocity. The overgeared fourth is a feature of luxury, designed to permit of occasional great spurts of speed, and is not in place on an economy car.

Barriers to Automobile Trade

AT the conclusion of a recent meeting of the Supreme Council of the Peace Conference a "Statement on the Economic Condition of the World" was issued in which it was urged that—

"The governments should also endeavor to contribute to the re-establishment of the economic life of Europe by facilitating the regular exchange of their domestic products and by removing all arbitrary barriers to the natural course of commerce. The Powers represented at the conference affirm anew their determination to collaborate with a view to carrying out this proposal."

Since this resolution was adopted there have been various attempts to erect further economic barriers, especially in connection with the automobile trade. Thus the French industry, which is now protected against American competition by a premium on dollar exchange of about 200 per cent, by high ocean freight rates and by an ad valorem duty of 45 per cent, recently demanded of the Government an absolute embargo on automobile imports. This demand is evidently in direct contrast to the conclusion of the Economic Conference, and in view of this fact the French Government could not well have granted it. Now, to save its face, the French Automobile Manufacturers' Association lets it be known that only a small fraction of the French industry was behind the demand for an embargo and the Association as a whole never favored the plan.

Italy also seems to be about to "erect new economic barriers" against trade in foreign automobiles. As regards American competition, the premium on dollar exchange is an even more powerful protection than in France, and freight rates to Italy also are somewhat higher, yet the Italian Government plans to levy a double duty on passenger automobiles, an ad valorem duty of 35 per cent and in addition a duty, based on weight, of approximately 10 cents a pound.

At a time when the American automobile industry is endeavoring to extend its export markets and already is working under a great handicap due to the foreign exchange situation, it is rather discouraging to see constantly new obstacles to foreign commerce arising. It is to be hoped that European governments in future will take more heed of the recommendations of the Economic Conference, in order that commercial relations may be re-established on the old lines and that prosperity may return to the nations.

Industry Seeks Tax Concessions

Net Loss Deduction and Deferment Asked

Emergency Legislation to Tide Manufacturers Over to Be Urged Upon Congress

WASHINGTON, Nov. 15—Whatever inventory losses were sustained by the automotive industry through recent price declines will be written off in tax returns provided the organized effort to obtain emergency legislation is successful. It was announced here to-day that Daniel Roper, former Commissioner of Internal Revenue, had been placed in charge of the movement which is intended to bring relief to these taxpayers who must pay the next installment of income and profits taxes by Dec. 15. It is proposed that Congress pass an amendment to the "net loss" section of the Revenue Act so that it will apply to the current year.

Price reductions were anticipated by Congress in the enactment of the Revenue Act of 1918, when provision was made to protect manufacturers and merchants from the effects of price stabilization. Inventories have been one of the problems of the automotive industry in the determination of tax returns. Congress expected that the post-war price flurry would be concluded before the expiration of the taxable year of 1919. With this period fixed in mind, it was provided that "if for any taxable year beginning after Oct. 31, 1918, and ending prior to Jan. 1, 1920, it appears upon the production of evidence satisfactory to the commissioners that any taxpayer has sustained a net loss, the amount of such net loss shall under regulations prescribed by the commissioner with the approval of the secretary be deducted from the net income of the taxpayer for the preceding taxable year."

Appeal to Be Made at Once

Roper, as spokesman for many industries which have been hit by the downward movement of prices, will appear before Congressional committees, immediately on the reconvening of Congress next month to urge authority for the postponement of the last installment for six months and an extension of the "net loss" provision to cover the taxable year of 1920, the period in which price recessions have been marked.

While high prices prevailed, manufacturers and others engaged in business were given their choice of two methods in filing tax returns. Invariably the market value, being out of proportion to costs during the period of inflated prices, was selected by taxpayers. The decline in market values in many instances has

put the value of the manufactured product below production cost. The taxpayer is obliged under the law to maintain the method originally adopted in a boom market. The amendment, if passed, would allow taxpayers, business concerns, which have recorded losses this year through shrinkage of values of stocks on hand, to deduct these losses from the income of 1919 in filing returns.

There has been talk of relief from the Federal Reserve Board in tiding over various firms, but Treasury officials point out the fact that the Federal Reserve Act does not give this authorization. The only relief must come through legislation. As to the necessity for action, Roper stated today:

Inventory Losses Large

"The tremendous decline since the first of this year in the market value of many staple commodities has resulted in an almost unprecedented shrinkage of inventory values. In many instances, these losses exceed the entire net income for 1919, and the unfortunate companies possessing such goods find themselves unable to convert their wares into cash or to obtain credit at their banks by which to meet their taxes, based upon their paper profits—profits that have never been realized. In some of these cases under the present law, unless it is amended before Dec. 15, it will be mandatory upon the Treasury to collect the tax by court action through distraint proceedings. This would mean financial disaster in many cases.

"A plan should be devised for legislative relief for such cases, whether arising from inventory losses or from other industrial and financial conditions, by deferring the tax payment for a period of, say, six months, under such safeguards as will extend the benefit only to those concerns which can not pay the tax. Where such payment is deferred, I would suggest that the normal rate of interest be as high as 8 per cent, to discourage those who might improperly take advantage of the Government under a lower rate of interest."

BARLEY ON FIVE DAY BASIS

KALAMAZOO, Nov. 15—Barley Motor Co. plant is now running five days a week, with about half its regular force on the payroll. Fuller & Sons Mfg. Co. is down completely but expects to start up again within four weeks. Operating full capacity this plant employs nearly 800 hands.

TO MAKE COMBINATION CAR

WICHITA FALLS, TEX., Nov. 15—The Wichita Motor Co. is preparing to put on the market a special car to be known as "the oil field tool pusher." It will carry three passengers and 1000 pounds of equipment.

Bankers Push Plans to Finance Exports

Seek Operation by January of \$100,000,000 Foreign Trade Corporation

NEW YORK, Nov. 12—Plans for the proposed organization by the American Bankers Association of a central foreign trade financing corporation with a capital of \$100,000,000 set forth that it should commence operations early in 1921, preferably in January, and that it should be representative of the entire United States, the various districts of which should have memberships on the board of directors and that parts of the funds be devoted to financing exports arising in these districts.

These aims, set forth in the report of the association's Committee on Commerce and Marine and adopted at the recent convention at Washington, will be followed in forming the new banking company, which will be organized under the Edge law. Another meeting of bankers and business men has been called by President John S. Drum, of the association, to meet at Chicago on Dec. 10 to take further action in the formation work.

The corporation in its entirety was planned by committees of the bankers association, the Chamber of Commerce of the United States and the National Foreign Trade Council. With a capitalization of \$100,000,000, the corporation, it is set forth, would be permitted to issue debentures against foreign securities to ten times that amount, thus giving it a maximum financial ability of about one billion dollars. The necessity for this great volume of potential financing is given by the committee as follows:

Must Maintain Foreign Sales

"We must have outlets for our products; a certain volume of foreign sales must be maintained, or the prosperity of the country will suffer throughout. But, after all, the purpose of the corporation would be two-fold: to render service not only here in promoting increased wealth and settled conditions but also abroad where such service can be safely rendered without undue risk and to the advantage of America's export trade. This can assuredly be done."

The company will be general in its nature, its facilities being open for all legitimate trade.

The organization work is under the direction of the association and its newly formed Commerce and Marine Commission, of which John McHugh, vice-president of the Mechanics & Metals National Bank of New York, is chairman, and William F. Collins, the secretary.

Akron Companies Cut Tire Prices

General Reduction Made by Leaders

Goodyear, Goodrich and Miller
Take Initiative—Other Com-
panies Study Action

AKRON, Nov. 15—Tire reductions ranging from 3 to 20 per cent have been put into effect by the Goodyear, Goodrich and Miller companies, the Goodrich prices going into effect coincident with their announcement Friday, and the Goodyear and Miller becoming effective to-day. Every tire manufacturer in Akron is expected to join the lower price movement within a week, indicating that the long expected break has arrived.

Greatest reduction among the three companies has been made by Goodrich, the cuts including all tires, both pneumatic and solid, and tubes. The general decrease ranges to 15 per cent and in some instances approximates 20 per cent, depending upon the size and construction.

The Goodyear cut is not a flat reduction in all sizes but reaches 15 per cent at its highest point. On all weather tread cord casings the cut is 7½ per cent, 10 per cent is dropped on straight side fabric all-weather casings, and irregular reductions ranging from 3 to 14 per cent on clincher fabric tires. Rubber tread casings, both cord and clincher fabric, now list at the same price as all-weather tread casings except on the 30 x 3½ clincher cord casing. Extensive improvements have increased manufacturing cost on this tire, officials say and no reduction is possible.

Regular tubes are reduced 15 per cent and heavy tourist tubes 10 per cent. There is no reduction in price on "tire savers," repair material or motorcycle casings or tubes.

Miller decreases range from 3 to 15 per cent. On cord tires the reductions average 12 per cent and from 10 to 12½ per cent on fabrics. Tubes have been cut on an average of 15 per cent.

Officials of smaller companies here to-day confirmed the report that they had been waiting for larger companies to start the downward trend and that they would release new price lists covering their products this week.

Crude Rubber at Low Level

Crude rubber prices now have reached the lowest levels on record. It is now selling around 20 cents a pound, as compared with 55 cents before the war for plantation. Conditions in the market are chaotic and have developed furious speculation by outsiders. Estimates of the stock held in this country place it at about 15,000 tons, or twice the supply

TRANSPORT BY TRUCKS; TRANSPORTATION, RAIL

WASHINGTON, Nov. 15—Transportation is transportation just as "pigs is pigs." There is a difference between hauling goods on a railroad and hauling the same goods on a motor truck. That difference now has been defined and a fresh meaning for another word goes into the dictionary automatically. Here is the difference:

Transport refers to merchandise transported by motor vehicles.

Transportation refers to merchandise transported by railroads.

The definition is authoritative for it has been adopted by the Highway and Highway Transport Committee of the Federal Bureau of Education.

usually on hand at this period. The industry was under Government control during the war and for that reason did not receive the same impetus as other industries, but it shared in the general inflation which followed the armistice.

Tire manufacturers had bought heavily and when the slump in business came they faced an urgent need for curtailment, but they did not attempt to get out of their contracts. They merely requested the rubber dealers to hold the commodity for future instructions, in most cases agreeing to pay the carrying charges themselves. This is one of the brightest features of the muddled situation.

Ajax Lowers Tire Prices

NEW YORK, Nov. 13—Ajax Rubber Co., Inc., will reduce prices 10 to 15 per cent, effective Nov. 15. The reduction is made, President de Lesser declares, to increase the volume of business. Though the company with others is suffering because of the depressed buying, he asserts it is still operating at a profit. Factories of the company are at Trenton, N. J.

The Republic Rubber Corp. will join in the general move to cut tire prices with a reduction of 15 per cent. The company now is operating at 25 per cent of capacity.

I. H. C. TRUCK OUTPUT GROWS

AKRON, Nov. 15—A new schedule calling for an increase of 20 per cent in production went into effect to-day at the Akron plant of the International Harvester Co., which manufactures motor trucks. Announcement of the increase was made after a visit to the plant by A. A. Jones of Chicago, assistant manager of the I. H. C. automotive works. The tire industry is much gratified by the move for it will mean increased demand for truck tires.

Standard Oil Cuts Gasoline One Cent

Eastern and Southern States
Benefited—Six-Cent Drop in
British Market

NEW YORK, Nov. 15—Announcement of a reduction of one cent a gallon in tank wagon prices of gasoline in States in which the Standard Oil Co. of New Jersey and the Standard Oil of Louisiana operate, is made by the New Jersey company. It will become effective to-morrow. The States include New Jersey, Maryland, Virginia, North Carolina, South Carolina, District of Columbia, Louisiana, Tennessee and Arkansas.

The reduction in price is said not to reflect lower costs but to be merely a move on the part of the companies to aid in the lowering of prices as part of the general commercial readjustment. Prices of tank wagon gasoline will vary in the different States because of the difference in freight costs. No prediction was made as to the effect upon retail prices.

The lowering of the price follows a drop of 6 cents a gallon announced by British companies because of "over-production in the United States." The drop in that country came as suddenly and unexpectedly as the increase of 14 cents a gallon made in August. Consumers in England attribute the slump to an investigation which is being made by the Central Profiteering Committee into the increase in price.

Producers in this country assert the belief that the lower price is due to a weakened market resulting from the entry of Russian products into the English market. It was predicted this would curtail shipments from the United States. Producers scoffed at the idea that there had been over-production in this country.

The Standard Oil Co. of New York has closed a contract with the Mexican Petroleum Co. under which 150,000,000 bbl. of gasoline will be delivered to the American corporation next year. The contract replaces one made a few years ago with the difference that the quantity to be delivered is much larger and the price substantially higher.

LEACH GUARANTEES PRICES

LOS ANGELES, Nov. 15—The Leach Biltwell Motor Co. has guaranteed its prices against decline until July 1 next. No guarantee is given against an increase in price, however. The five-passenger model sells at \$5200, the three passenger roadster and the seven passenger touring car at \$5700 plus war tax.

Standard Parts Near End of Receivership

Approval of Financing by Stockholders Smooths Difficulties —To Sell Five Plants

CLEVELAND, Nov. 15—Lifting of the receivership of the Standard Parts Co., probably by Dec. 1, seems probable as the result of action by the stockholders in ratifying a refinancing plan proposed by committees representing the creditors and stockholders. In its broad aspects this plan was acceptable to L. H. Perlman of New York whose action in seeking an injunction restraining the officers of the company from issuing 50,000 shares of common stock precipitated the receivership. This stock will not be issued.

The acceptance was made by the stockholders after the committee and officers of the corporation disclosed that the company has plants and organization to produce \$40,000,000 worth of goods per year; that the company to-day has orders booked for \$16,000,000 worth of goods; that after allowing liberal reserves for accounts receivable, inventory and plants there remained an equity of \$12,600,000 for stockholders; that after taking care of the preferred stock at par, with all back dividends, there is an equity of \$6,000,000 for common stock and that since J. O. Eaton took hold of the management of the corporation six months ago the net earnings were \$663,000.

Under the refinancing plan, the stockholders are to subscribe to \$4,000,000 worth of Class A preferred stock of the company; a number of Cleveland investment houses have agreed to underwrite \$4,000,000 of the preferred stock and local banks are to provide \$3,000,000 of credit on reasonable terms provided the refinancing plan was accepted by stockholders and their necessary subscription was made.

That the whole plan will be carried out was prophesied by officers and directors. It was stated that stockholders already have subscribed for one-third of the amount allotted to them, many calling and entering subscriptions before the plan was officially submitted to them.

Eaton Contract Cause of Suit

Frank A. Scott and J. O. Eaton were appointed joint receivers of the company a few months ago by Federal Judge D. C. Westenhaver on the application of a stockholder who alleged that he was disappointed with a contract made for the retention of J. O. Eaton as general manager of the corporation. Other causes also were assigned for the suit.

Scott said at the meeting of stockholders that usually a receiver finds a company's affairs in worse shape than they appear on the surface, but in the case of the Standard Parts Co., conditions were better than they appeared. He said he thought Eaton and his associates were doing what was right and if he were a stockholder he would want Eaton

as manager. Scott said that the central office overhead had been cut more than 50 per cent and economies had been effected in all departments. He also said the company was far from insolvent.

Horace Andrews, of the law firm of Hoyt, Dustin, Kelley, McKeehan and Andrews, presented to the stockholders the plan for the refinancing and reorganization. He said that the Standard Welding, Bock Bearing, Perfection Springs, and Eaton Axle plants, which are subsidiaries, rank with the leading plants of their kind in the country. He said that it had been decided to sell the rest of the plants owned by the corporation and to use a portion of the proceeds of this sale to retire the prior lien preferred stock, thereby strengthening the other securities of the company.

Will Discontinue Five Plants

This means that the following plants of the company are to be sold: The Cincinnati Axle, an axle and a spring plant at Canton; the American Ball Bearing plant in Cleveland, and the Vehicle Spring and Axle Plant at Connersville, Ind., or five in all.

F. F. Prentiss, one of the directors, advised stockholders that the old contract with J. O. Eaton had been annulled and that the 50,000 shares of stock issued thereunder had been returned to the company's treasury. On behalf of the company he then offered a new service contract to Eaton and this was referred to the new board of directors, who were empowered to act in the matter.

Fred H. Goff, president of the Cleveland Trust Co., as chairman of a special committee consisting of Andrew Squire and J. O. Eaton in addition to himself, proposed the following as directors and they were voted into office: F. F. Prentiss, J. O. Eaton, H. P. McIntosh, John Sherwin, William L. Day, Dudley S. Blossom, Walter D. Sayle, Franklin G. Smith, A. W. Henn, E. J. Hess, F. R. White, W. E. Bock and W. H. Prescott.

October Shipments Show General Drop

NEW YORK, Nov. 15—Shipping reports received by the National Automobile Chamber of Commerce, covering 90 per cent of the total volume of business, indicate that complete figures for October will show shipments of 18,000 carloads of automobiles, 12,000 driveaways and 2200 machines shipped by boat. This compares with 29,843 carloads, 13,402 driveaways and 3753 boat shipments in October of last year. Figuring the driveaways and boat shipments in carloads, the October business is 25 per cent less than September and 38 per cent less than October, 1919.

HIGHLAND TRUSTEES NAMED

BOSTON, Nov. 12—Faelton C. Perkins, Angier L. Goodwin and Samuel J. Freedman were elected trustees in the bankruptcy case of the Highland Machine Co.'s first meeting, before Referee Olmstead, in the United States Bankruptcy Court.

Kelly Truck Added to Hare's Companies

New Management to Push Production and Sales—Hare's Officers Take Charge

SPRINGFIELD, OHIO, Nov. 15—"Beginning at once the operation of the Kelly-Springfield Motor Truck Co. will come under the control of the Hare's Motors which also operates the Locomobile Co., the Mercer Motors Co., and the Simplex Automobile Co., Inc.

This announcement is contained in a letter, which is being issued by the Kelly-Springfield Motor Truck Co. to the Kelly dealers. The letter is signed by James L. Geddes, chairman of the board.

Concerning the affiliation of the two organizations and the future of the Kelly company, the letter says in part:

"At a directors' meeting held in New York the writer was elected chairman of the board of directors of the Kelly company and Emlen S. Hare, president of the Kelly company.

"The purpose of this combination is to increase the volume of business and we ask your co-operation to attain this. We now have a completely equipped factory, capable of big production, and with this in mind more ability, and not less, will be required.

"With the addition of the Hare's Motors engineering and supervision you can be assured of even greater engineering advancement than in the past, as the ideas of several engineers combined will result in advanced ideas."

Besides selling the output of the Kelly company's plant, the officers of the Hare's Motors Corporation will enter into the management of the company. Three of the Hare's Motors officials will become vice-presidents of the Kelly company, as follows: H. D. Church, vice-president in charge of engineering; Ormond E. Hunt, vice-president in charge of production, and Henry Lansdale, vice-president in charge of distribution. These three vice-presidents are all old Packard officials who left that company and joined the Hare's Motors.

There was elected at the meeting of the board of directors in New York at the same time the following directors: Emlen S. Hare, H. S. Parker, J. A. Bower, of New York City; Horace E. Schenck and P. A. Lewis, of Springfield.

Parker is of the firm of Colgate, Parker & Company, and Bower is vice-president of the Liberty National Bank, of New York City.

The stockholders of the Kelly-Springfield Motor Truck Company at a meeting here two weeks ago authorized the increasing of the common stock \$2,000,000.

PRESTON RESUMES STRIDE

BIRMINGHAM, ALA., Nov. 15—The plant of the Preston Motors Corp. is now in full blast and the management asserts that it has on hand more than 1000 bona fide orders.

Fokker Seeks Sales for Monoplane Here

**Would Defer All-Metal Construction While Waiting Tests—
Studies American Plants**

NEW YORK, Nov. 16—Anthony H. G. Fokker, inventor of the Fokker monoplane which served Germany so well in the world war, arrived in this country last week in search of business, as he frankly admitted. He is now in Washington, presumably in an effort to sell planes to some branch of the Government. He was accompanied by Col. Virginius Clark of McCook field.

While Fokker's visit is primarily a search for business, he will take advantage of the opportunity to inspect American airplane plants and study the progress of aviation in this country. He already has looked over the Curtiss plant at Mineola.

In some respects Fokker's views on the future of aviation coincide with those of American makers of aircraft. He does not believe manufacturers should rush headlong into the building of all metal planes but should await the results of careful study and experimentation before taking so radical a step. In this respect his opinions differ from those of Dr. Junker and other Germans who are attempting to sell this country on the all metal plane in which they have been pioneers, chiefly because of necessities imposed by the war.

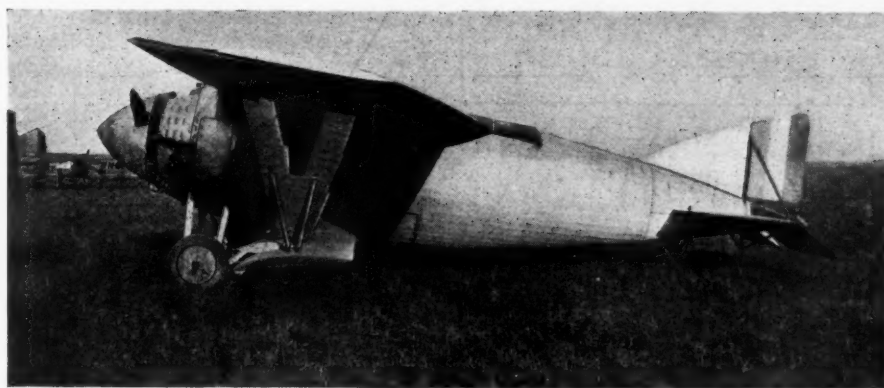
Fokker was accompanied to this country by his secretary, Robert B. C. Noorduyn, formerly chief engineer of the Armstrong Whitworth works in England. While he built planes for Germany during the war Fokker never lost his Dutch citizenship. He asserts that he offered his machines to England and the United States in 1912 but they were refused and he then turned to Germany. He never was in the German army, however, or in the service of the German Government.

Monoplane Fastest in War

The fuselage of the Fokker pursuit plane, acknowledged by the Allies to have been the fastest used in the war, was made of steel and the wings of wood, without struts or braces. Just before the armistice was signed Fokker had invented a new machine gun designed to fire 4800 shots a minute. He explained this by saying that the Allies had five times as many planes as Germany and it was necessary to make a gun which would shoot six times as fast.

The Dutch inventor said his new commercial airplane was carrying the mail daily between London, Brussels, Berlin, Hamburg and Copenhagen.

"The feature of my machine," he said, "is the cantilever wing, having no braces and attached to the fuselage by four bolts, eliminating adjustments. The frame is of seamless tube steel. The wing is constructed of three ply wood, responding to strain without deterioration and capa-



The Levavassor Variable Wing Plane

Novel wing construction permits plane to fly at 90 m.p.h. and land at 30 m.p.h. It is considered certain the builder will win the French safety prize

ble of supporting six times the normal load. An altitude of 4000 meters can be attained in 40 minutes with a load of 1550 lb. The machine will carry six persons, five hours' fuel supply and develops 185 horsepower with a speed of 105 miles an hour.

"Next year we will have 12 machines in the Amsterdam-London service, each carrying 980 lb. of mail. We are now building a new 12-passenger type of 450 horsepower with an average speed of 110 miles an hour. Our new factory in Amsterdam can turn out 20 machines a month and employ 500 men."

Fokker is a firm believer in the future of commercial aviation and believes that regular trans-Atlantic flights will be made in the near future in perfect safety.

Saulnier, a French inventor, is another foreign aviation expert now in this country. He has come here in connection with a proposal for the construction of a plant in this country for the manufacture of his machines with American capital.

Complete 456 Homes for Akron Workers

AKRON, Nov. 15—Its first big program of 456 dwellings has been virtually completed by the Home Owners Investment Co., formed eighteen months ago by F. A. Seiberling, H. S. Firestone and other tire manufacturers. The company was capitalized at \$5,000,000 but only \$2,100,000 of the stock was sold. The corporation operates on the plan of loaning up to 90 per cent of the value of the completed home if the prospective owner has a lot paid for which alone or with other collateral is worth at least 10 per cent of the cost of the house. The promoters are taking only 6 per cent on their investment and all other earnings will be turned into a fund to build other houses.

TO LEASE FLYING FIELD

LYNN, Nov. 13—The Lynnway Aircraft Corporation has offered the city of Lynn \$3,250 for a four years' lease of 57 acres of reclaimed land on Broad Street which it has used since the summer as a flying field. It is proposed to restrict the use of the field to aircraft and keeping and selling auto accessories.

Levavassor Builds Variable Wing Plane

**French Aviation Pioneer
Achieves Model Capable of
High and Low Speeds**

PARIS, Nov. 1 (*Special Correspondence*)—An airplane with variable wing surface, capable of starting and landing at low speeds and of flying at high velocities has been produced by Engineer Levavassor and undoubtedly will win the French prize for the best device for making flying safe.

Levavassor, the inventor of this machine, is a French pioneer, who built a plane which flew before the Wrights appeared in Europe, who secured fame as the designer and builder of the Antoinette monoplane so successfully flown by the late Hubert Latham, and who built the first light weight 8-cylinder aviation engine in Europe. The new Levavassor biplane has a wing with a fixed central portion and two additional surfaces, one of which can slide under and the other over the main surface. For starting and landing the additional surfaces are pushed respectively forward and rearward, thus considerably extending the chord of the wing. When in the air the two surfaces are brought respectively under and over the wing, thus reducing the bearing surface.

In the experiments carried out near Paris the device proved very successful, no difficulty being experienced in varying the wing surface while in flight, with the result that the plane attained a speed of 90 miles an hour in full flight and landed at 30 miles an hour.

MARK CANADIAN AIRLINE

OTTAWA, Nov. 15—With airdromes marked out every fifty miles and with wireless control of the planes, there would be nothing to prevent a regular forty-hour air service between Halifax and Vancouver, according to General A. K. Tylee, who has reached Ottawa on his return from the successful trans-Canada flight.

Special Cables

Olympia Show Ends with Outlook Better

Sales Resumption Forecasted for New Year—Criticize American Open Models

(By Cable to AUTOMOTIVE INDUSTRIES)

LONDON, Nov. 13—The motor show, which closed at Olympia to-night, ended with better trade prospects than were apparent at the outset. The volume of actual business steadily improved but the prospective trade was the bigger feature.

The demand was mainly for light cars, apparently because of price, new taxation and elimination of paid drivers. Business in medium priced cars was moderate but difficult to gauge because there has been much silence regarding it. The call for big automobiles is slumping and many owners of them say they must buy small cars.

Much of the blame for lack of business was placed on the government because of its action in increasing taxation on horsepower rating. An effort probably will be made to have it reduced by half, but it seems too late to get action for the next fiscal year.

American sedans won much approval at the show. They were more roomy than the others and their appearance was good, but the open American cars were criticized for lack of seating comfort and the intrinsic quality of the body work. These cars were held to be too expensive as compared with European cars of the same class.

Business prospects are not expected to declare themselves before the new year, as price reductions may be looked for by that time. Dealers and the public are holding back in this belief and because of the present financial strain. Improved trade and the promise of normal business stability will decide the fate of many motor concerns here.

Altogether the situation at the close of the show is more hopeful but far from satisfactory.

The comparative absence of commercially useful novelties at the show has led old hands here to discuss the possibility of motor shows meeting the fate of the bicycle shows. They hold that the only justification for motor car displays is the business element. Next year's show probably will go far to decide the future of motor expositions or at least of annual displays.

SWEDEN PROPOSES TAX

NEW YORK, Nov. 15—A proposal to tax automobiles in Sweden has been made by the Swedish Highway Commission, the yearly rate being 50 crowns (\$13.40 at normal exchange) for all cars having a horsepower rating of ten or less, with an

added 10 crowns (\$2.68 at normal exchange) for each additional horsepower. This proposal was reported to the Bureau of Foreign and Domestic Commerce by Consul General Dominic I. Murphy, of Stockholm, under date of Oct. 19.

No tax, either governmental or municipal, has been imposed there on automobiles, Consul Murphy declares. To make the proposed tax effective, the Highways Commission recommends that all owners of automobiles, upon applying for registration, must furnish exact details as to the horsepower. The tax is to be collected by the Government and afterwards distributed to the various districts for road maintenance. It is intended to cover all cars, whether used in the cities or in the country.

Wrigley Shows Loss of \$722,000 in Year

LONDON, Oct. 29 (*Special Correspondence*)—The just published fiscal year's report of the E. G. Wrigley Co. of Birmingham, makers of tools and motor components, is not likely to allay the unrest of investors in British motor stocks of the more speculative sort. In April last the company had an issue of 300,000 ordinary shares at \$5.50 each for the purpose of carrying out its policy of extensions and to finance the acquisition of interest in J. Tylor & Sons, Ltd. and Holcroft Steel Foundry, Ltd. It paid an interim dividend of 24 cents per share in the spring of this year, which apparently was provided from the reserve.

The report shows a net loss for the year of nearly \$722,000. Naturally there is no final dividend and the shares which previously have been quoted at 5% to 7% became a nominal market yesterday at 5% to 6%. This exceedingly unsatisfactory result is attributed to the molders' strike, but even so the directors appear to have laid themselves out for severe censure in paying the interim dividend.

BOILLOT SIGNS WITH SUNBEAM

PARIS, Nov. 1 (*Special Correspondence*)—André Boillot has joined the Sunbeam racing department and will be at the wheel of a Sunbeam car in both the Indianapolis 500-mile event and in the French Grand Prix. Boillot has been connected with Peugeot since his school days, and indeed the whole Boillot family is attached to the Peugeot company in some capacity or other. It will be remembered that his brother George, who was killed during the war, had been connected with Peugeot during the whole of his career.

Sunbeam and Darracq are working together on their racing program. for the two firms are now combined. The cars are being designed by Louis Coatalen, but those bearing the name Sunbeam will be built in the Sunbeam shops at Wolverhampton, England, while the Talbot-Darracqs will be produced in the French factory of the Darracq company. It is not yet known who will be selected to drive the Darracqs, but René Thomas is spoken of as possible member of the team.

Standard Oil Moves to Cut Costs Abroad

Begins Installation of Bulk Storage Tanks—Fuel Costs Check Touring

PARIS, Nov. 1 (*Special Correspondence*)—A fight between Standard Oil and Royal Dutch interests in France is just beginning and undoubtedly will be instrumental in reducing the retail price of gasoline. In France all gasoline is sold in cans of 5 litres, with the result that costs are unnecessarily increased. The Standard Oil is now making arrangements to install bulk storage tanks on the premises of roadside dealers and in garages, charging the mere cost for this work. By thus abolishing the cost of the cans, labor in filling them, depreciation and renewal, a considerable reduction will be possible in the retail price of gasoline. The few dealers who have already adopted bulk storage at their own expense have been able to drop the price of gasoline from 56 to 51 cents per litre. The bulk of the gasoline sold in France is handled by small grocery and dry goods stores, and these men will not go to the expense of installing tanks. The Standard Oil's offer to do the work at cost undoubtedly will interest them.

During 1911, 1912 and 1913 France imported 190,000 tons of gasoline annually. During the four years of war the importation was 1,500,000 tons; in 1919 it was 350,000 tons, and for the first six months of 1920 the amount was 250,000 tons. Although there is a big increase in the consumption of gasoline compared with the pre-war period, France is not using as much fuel as she should. During the month of August, which is the period when the greatest number of passenger cars are in service, the consumption was the lowest on record. This is owing to the fact that owners preferred not to use their cars rather than pay from \$1.80 to \$2.40 for a gallon of gasoline.

Recent borings near Clermont-Ferrand, France, have revealed the presence of petrol. Oil was struck at a depth of 1500 feet between the Crouelle and Poix hills, about three miles from the town of Clermont-Ferrand. These borings were undertaken under the direction of the Government geological service, and the belief is held that an important supply of petrol is available. The search for petrol is also being carried out in various parts of the French protectorate of Tunisia with very encouraging results.

MAKE NEW PISTON RING

CLEVELAND, Nov. 13—The Pennsylvania Piston Ring Co. of this city has begun the manufacture of a piston ring known as the Instant-Pep-Co. It is a concentric ring with lap joint and there are two angular oil grooves on the outside.

Tractor Education Need of Argentina

American Sales Manager Finds Fine Potential Market in South America

NEW YORK, Nov. 12—The spirit of what the tractor means in agriculture has to be told not only to the farmers but to the concerns engaged in selling tractors in Argentina and other South American countries, according to C. W. Hadden, who has just returned from a six months' investigation trip through several countries of South America. The dealers in those countries have to be educated on what a tractor can accomplish. The farmers have to be educated on what a tractor will do on a farm of 160 hectares or any other size. These farmers have to be educated on what quantities of fuel are needed in cultivating such an area. They are not familiar with the various possibilities of using a tractor in addition to cultivating the soil.

Hadden, who made the trip in the interests of the Minneapolis Steel & Machinery Co., of which he is export manager, believes there is a large potential market for tractors and that our present type of small machines will meet the requirements of a great agricultural area such as Argentina. As an example he cites a farmer owning 160 hectares which he wished to cultivate in flax. The farmer estimated that fifty horses were necessary for this work. He has purchased two tractors and expects them to be sufficient.

Each horse in Argentina calls for the produce on 1½ hectares to feed it for a year. These horses are not much more than 50 per cent as capable as the American horse. A big educational program is needed to educate the farmer to the possibilities of the tractor and to have him think intelligently on the capacity of a tractor as compared with the capacity of horses.

Should Make Direct Connections

Hadden recommends that tractor manufacturers should attempt to establish their own direct connections with importers in these countries. The manufacturer must not lose interest in the tractor once it is loaded on ship at New York port. The growth of his future business depends on the good operation and careful maintenance of the machine. This is best done through some direct representation in Argentina or Brazil.

He cited examples of some tractors little known in the United States and which had been exported in larger numbers than they were sold domestically, but which had not received the necessary service and were a bad advertisement. In Argentina plowing is generally done with a 14-inch bottom, three or four horses being necessary on a single bottom plow. Some farmers use two 10-inch bottoms.

The sale of tractors in Argentina is

just getting started. In 1918 approximately 100 were sold, 400 in 1919, and in 1920 approximately 1000. The European tractor has not got started in large quantities. Approximately ten Renaults and two Fiats have been sold. Three or four makes of American tractors are selling in considerable numbers and while the majority of American makes are not selling well, they are nearly all represented. The trouble is lack of education on the tractor movement in general. Mr. Hadden recommends some co-operative activity on the part of tractor manufacturers by way of educating the consumer on what a tractor is, what it will accomplish, and how it must be serviced.

Canada Defines Duty on Tractor Imports

WASHINGTON, Nov. 13—Increased demand for American tractors has brought inquiries from manufacturers as to duties assessed by Canada on these imports. The American consul general at Winnipeg, Manitoba, has obtained the latest data as to customs duties which show that tractors valued at not more than \$1400 imported by farmers for farm use are admitted free of duty but subject to an importer's sales tax of two per cent of the value.

Tractors valued at less than \$1400 imported by machinery companies for sale to farmers for farm use are admitted upon declaration of the importer to that effect, subject to duty at the rate of 17½ per cent of the value and an importer's sales tax of one per cent to be estimated on the value plus the duty paid. Tractors imported for farm purposes which are valued at more than \$1400 are dutiable at 17½ per cent and an importer's sales tax of two per cent estimated on the duty paid value. Where tractors are imported for other purposes than farm use the duty is fixed at 27½ per cent of the value, plus the two per cent importer's tax. The importer's sales tax has been effective since May 19, 1920 and the free entry of tractors for farm use when not valued for more than \$1400 since Feb. 7, 1919. Knocked down tractors have the same rates.

TUNIS TO SHOW TRACTORS

NEW YORK, Nov. 12—An exhibition of foreign and French makes of automotive farm equipment and tractors, with a week's trials, will be held in Tunis from March 17 to 24, 1921, according to a report from Vice Consul Charles B. Beylard of Tunis to the Bureau of Foreign and Domestic Commerce. Entries will be received until Dec. 1.

The Consul reports that Tunisian farmers are realizing the possibilities of power farming. Up to July, 1919, he says, there were no more than 50 tractors in the district, but during the twelve months ending July, 1920, 558 tractors were imported into Tunisia. Of these, 54 were of French manufacture and 504 of foreign, mostly American, manufacture.

Output Insurance Gets Trial in Italy

Manufacturers Make Contract With Lloyds to Protect Against Production Loss

WASHINGTON, Nov. 12—Advices were received to-day from the American commercial attaché at Rome as to the plan of mutual insurance against interruption of industrial activity. The incessant and costly halts in steady industrial operation, which have beset Italian producers, brought into being a definitely organized scheme on the part of the Italian Manufacturers Association to provide insurance against interruptions in the continuity of production. The aim, of course, is to insure against financial losses incident to cessation of production.

The American attaché stated that the new insurance arrangement will go only so far as to guarantee the insured members against losses arising from interrupted production which are readily ascertainable. The assurance of a minimum profit on the invested capital whether production keeps up or stops, is left to be worked out in the future. According to the Government agent the insurance is a safeguard against "unexpected damages," the liability of those fixed general expenses which are incurred even when a plant closes down entirely. The manufacturer having membership in the new organization must arrange for insurance in the amount of a total fixed amount. One three-hundredth of this amount will be the sum payable for every day of inactivity, on the assumption of 300 working days in each calendar year.

It is further explained that "coefficients" are to be determined by the association's board of directors, which will be graded according to the liability of the various kinds of industry to interruption. It is the intention of the association to use these coefficients as a basis for premiums. The maximum premium will not exceed 5 per cent of the total amount of insurance. Provision is made for an assessment of 5 per cent additional should the initial amount be exhausted.

Safeguard Expenses at Outset

The insurance contract is with London Lloyd's which provides for an initial reserve of 20,000,000 lire. Two limitations have been made to guard against heavy losses at the beginning of the project. These items refer to the right to payment of damages making it impossible for a new member to obtain damages until the expiration of two months as a holder of an insurance certificate. Neither will payment be made for the first seven days of inactivity, supposing that production is halted for so long a period.

The information which has been distributed by the Department of Commerce here has created a profound impression in labor circles as well as in business.

Minnesota Approves State Roads Plan

**Under Babcock Bill 28,850 Miles
of Improved Highways Are
Made Possible**

MINNEAPOLIS, Nov. 12—By a decisive majority the voters of the state have "lifted Minnesota out of the mud" by approving the constitutional amendment known as the Babcock good roads plan at the recent general election. The Babcock amendment, so-called after C. M. Babcock, state highway commissioner, its author, authorizes the construction and provides a method for the financing of a state trunk highway system of approximately 7000 miles of arterial roads during the next ten years. By the establishment of the trunk highway system, all local funds—state aid, county and township levies—are left intact for utilization by these units in the construction of local or feeder roads, an arrangement which according to Babcock, makes possible the construction of 21,850 miles of graveled roads by the minor governmental units in ten years.

In other words, the citizens of Minnesota have given their approval to a plan which will mean 28,850 miles of improved roadway before the end of 1930.

These trunk highways which are to extend to every section of the commonwealth, are to be "located, constructed, reconstructed, improved and forever maintained as public highways by the state of Minnesota." To finance the project, the legislature is authorized to issue and sell bonds, these bonds to be retired by the proceeds of an increased tax which is to be levied on all motor vehicles. The amendment limits the issue of bonds in any calendar year to \$10,000,000 par value and provides that never shall there be more than \$75,000,000 in bonds outstanding.

The tax which will be levied on motor vehicles will be in the form of a graduated license fee, ranging from approximately \$10 a year for Fords to \$15 to \$20 for medium priced cars with the average fee at \$18. This will be in lieu of the present license fee of \$1.66 and the personal property tax on automobiles which, according to the Minnesota Tax Commission, averages \$5.60 per car. Should the legislature decide on a license fee which would average less than \$18, there is provision for a corresponding reduction in the amount of bonds which may be issued so that in any event the bond issue will be such as may be retired by the motor vehicle tax.

Adjusts Burden of Costs

One of the outstanding features of the plan is its effect on secondary or feeder roads. Based on the average of the last two years, the local government funds available for road work amount to \$10,925,000 annually. Babcock estimates, however, that 80 per cent of the money spent on road improvement and

construction in Minnesota goes into the main or arterial highways, the class which his plan removed to state jurisdiction. This will relieve the counties and townships of the enormous burden of caring for these arterial highways and will leave these units free to apply their funds to purely local roads. For the ten year period which the state highway commissioner estimates will be required to complete the system, these local funds will amount to a total of \$109,250,000, all of which can be devoted to feeder or secondary roads. Computing this construction of graveled roads at \$5,000 a mile, this will mean 21,850 miles of improved secondary roads.

Non-Partisan League Objects

The Babcock amendment in the campaign was accorded the unanimous and enthusiastic support of automobile dealers and clubs, civic bodies, all good roads organizations and the women's clubs over the entire state. "Lift Minnesota out of the mud" became the slogan of all who were interested in the greater Minnesota which the plan made possible. The economic advantages which would accrue from the plan, its advertising value to the "State of 10,000 Lakes," the advantages to the farmer—all these were brought to the attention of the voters by the newspapers and speakers for the amendment. Full page advertisements and editorials appeared in the leading papers of the state and in the larger cities, advocates of the Babcock amendment staged monster parades to drive home the necessity for its support at the polls. The only opposition to the project came from the Non-Partisan League.

Buy as Needs Require, Advises Bank Head

MILWAUKEE, Nov. 15—Milwaukee bankers are co-operating with retailers in all lines in a three-weeks' campaign of education of the public as to the fundamentals of present conditions in relation to purchasing, and excerpts of the statements made by the bankers will be used as parts of local newspaper advertisements by dealers in automobiles, tires and accessories just as they will be used by dry goods merchants and grocers. The First Wisconsin National Bank has offered its facilities for the purpose of centralizing the entire effort.

An initial shot in the campaign was an interview given by Oliver C. Fuller, president of the bank. He said: "It is too much to expect the return of 1914 prices. We are doing very well to have a price level which is about that of the beginning of 1917. Not in a generation have prices taken so much of a slump in so short a period. It was only natural that when the decline began, purchasers should hold off for lower prices. But who knows whether the decline will continue, or if the scarcity caused by low production due to a refusal by the public to buy, may not cause a renewed upward trend? The wise buyer will not speculate either in the rise or fall of prices, but buy as needs require."

Investigation Shows Public Favors Cars

**Failure to Buy Ascribed to Lower
Price Influence and Bank
Prejudice**

NEW YORK, Nov. 15—Slow but steady improvement in the retail sales of automobiles with a general upward trend in the business was disclosed by a survey of the country made last week by the H. E. Lesan Advertising Agency of this city and Chicago.

The information, obtained from various sources almost entirely foreign to the merchandising of motor cars, coincided almost exactly with the surveys supplied AUTOMOTIVE INDUSTRIES by its correspondents in the leading distribution centers of the country. The two together offer indisputable testimony that sales resistance is weakening so far as passenger cars are concerned.

This was the telegram sent out:

"Many present and prospective automotive advertisers anxious learn prospects automotive business immediate future independent usual dealer and business connections. Could you have reporter interview few citizens various lines occupation and wire night letter giving their opinion effect of recent price changes on immediate sales, possibility consumer buying this year and outlook for next year. Also opinion your automobile editor on subject. Real facts desired, agreeable or disagreeable."

Here is a summary of the replies:

"Replies confirmed the prejudice of bankers against the industry but showed that this prejudice is not shared by the public. Varying effect of initial price reductions was indicated, but the belief prevails that, initial reductions having been made, that general and even further reductions or guarantees against them are necessary to restore full confidence in respective buyers. A gradual but steady resumption of buying on individual cars has been noted where buyers are satisfied on this score, reducing dealer stocks, which should soon be felt at factories. Many comment on the fact that manufacturers, dealers and salesmen must overcome the demoralizing influence of the past sellers' market and get down to a business basis with real work and genuine service. Reports are almost unanimous that general business conditions are fundamentally sound and that the country is only going through a necessary period of deflation after which business will be normal at new prices.

Cars Necessary to Public

"The reports said that motor cars are as necessary to the public as anything else and that the volume of business at the new price levels should furnish considerable trade yet this year, get to normal by early spring and be as large next year as this if the industry is prompt in making decisions, quick in action and aggressive in salesmanship."

Goodyear Financing Based on Inventory

All Finished Stock Assigned as Security—Pass Dividends for First Time

AKRON, OHIO, Nov. 13—Official announcement was made to-day by the Goodyear Tire & Rubber Co. that the program of refinancing to the extent of \$25,000,000 had been consummated successfully with a group of leading American banking interests headed by the Goldman, Sachs Company of New York. This is the first official word coming from Goodyear relative to its refinancing and confirms the announcement in AUTOMOTIVE INDUSTRIES that the company had practically unlimited funds at its disposal. Under the new financing program Goodyear inventories of finished product are assigned to the financing interests as security. The arrangement places no incumbrances on the Goodyear plant or equipment, it is officially announced, and will in no way affect the ownership or management of the company's business. The refinancing does not affect the Goodyear company in California.

In an official statement issued to-day by the company to all its division and branch managers, L. C. Rockhill, general sales manager, says:

"We have seen our sales dropping off because automobile and truck manufacturers were cutting production and because dealers were reducing stocks and refraining from the usual stock replenishment. As business continued to decline it became necessary for us to reorganize our sales force and to assign many executives to more definite sales tasks and to enlarge territories so that we could operate with reduced sales personnel. The reorganization plan has now been perfected and we have just arranged with a group of banking interests to supply us with \$25,000,000 of additional finance which will be adequate to carry us over the period of depression.

No Encumbrances on Plant

"Naturally banking interests require security for the funds they are advancing to us and this has been arranged in an admirable manner by assigning to them our inventories of finished product. This arrangement places no incumbrances on our plant or equipment and in no way affects the ownership or management of the business. Arrangements are being made covering the handling of stock under the new financing plan but there will be no interruption in the facilities of our sales department for making prompt deliveries to customers.

"We will be able to meet our obligations promptly and we can proceed to pursue sales with confidence that when this period of depression is past the prediction we made four months ago will come true—that Goodyear would emerge from the period in a stronger position in

the trade than ever before. The company now is in a more secure position than it has been for months and there are plenty of assets back of every share of stock in the company."

This announcement comes close upon the heels of the action of the directors Saturday in passing the regular quarterly dividend on the common stock for the first time in the history of the company. Goodyear outstanding common stock exceeds \$61,000,000 and the outstanding preferred stock approximates \$59,000,000. Action on the regular quarterly dividend on preferred stock will be taken in January. The common paid 12 per cent annually up until the last meeting when the dividend was reduced to 10 per cent. The directors issued the following statement after the meeting:

Stockholders to Get Letter

"At the meeting held to-day it was decided by the directors that in view of the present financial and business conditions and in order to conserve the cash resources of the company it is inadvisable to declare the usual quarterly dividend on the common stock payable on Dec. 1, 1920. A letter is being prepared and will be mailed to the stockholders in a few days setting forth the condition of the company's business and assuring the stockholders as to the soundness of their investment."

Westcott Sales Heads Push Sales in Field

SPRINGFIELD, OHIO, Nov. 13—It is announced at the plant of the Westcott Motor Car Co. here that reports from sales-managers in various sections of the country show an increased demand for cars. Lately there have been good sized shipments leaving the works. Export orders were filled during the past week for Richardson, Orr & Co., of New Zealand, distributors for the Westcott company in that territory.

General Sales Manager E. H. Gilcrest is making a trip through the West visiting Westcott distributors. After stopping a few days in Chicago he will go to Omaha, Denver, Salt Lake City and other points on the west coast. He will meet E. H. Kron, sales-manager for the Pacific coast, at Salt Lake City. They will make the trip together, visiting the western cities. W. A. Hinchman, of Springfield, southern sales-manager, has left on a trip through the southern territory, after spending several days at the factory. C. F. Vincent, district service manager, who has been at the Westcott plant, has also left on a southern trip.

DODGE CONTINUES SCHOOL

DETROIT, Nov. 12—The Dodge Bros. service school, which is maintained for the benefit of dealers who are interested in having their service heads become better acquainted with factory service methods, is to remain in operation all winter. The course lasts one week and covers timing, storage battery, reboring, generator, ignition, engine, carbureter, clutch, gearset and steering gear.

Overland to Reopen Parts Department

Deny Significance in Sale of Willys-Earl Homes in Toledo —Inventory Progresses

TOLEDO, Nov. 15.—W. H. Kilpatrick, vice-president in charge of production at the Overland plant here, said to-day that the reopening of the parts department to-morrow or Wednesday, putting 2000 men back at work was sufficient response to reports that the factory would be closed indefinitely. He said the entire plant would be in operation again as soon as inventory was completed.

Kilpatrick added that the inventory was started in the parts department because of demand for parts from dealers all over the country. Day and night shifts are working to complete it so that the work of checking up other departments can be undertaken as quickly as possible.

Officials at the plant denied that there was any significance to the fact that the homes here of John N. Willys, president of the Willys Corp. and C. A. Earl, vice-president of the Willys-Overland Co., have been offered for sale. Toledo is full of rumors about the future of the Willys interests but no particular foundation can be found for any of them. The one most frequently heard is that Willys will take over the Maxwell and Chalmers companies. The only color which can be found for this is that Walter P. Chrysler and John R. Harbeck, who head the Maxwell-Chalmers management committee, are high in the Willys councils. Officers of the Overland company declare they are tired of denying rumors of impending changes.

FAMOUS TRUCK BOOKS MISSING

DETROIT, Nov. 15—At the initial meeting of creditors of the Famous Truck Co., Inc., of St. Joseph, Mich., it developed that the court had been unable to procure books or records showing the amount of stock sold or the names of stockholders. It is reported that between \$100,000 and \$200,000 worth of stock in the company was disposed of. Appraisal of the assets showed \$22,788.80 against an indebtedness of \$89,254. This latter, however, does not represent the loss to stockholders.

F. H. BALL DIES

DETROIT, Nov. 15—F. H. Ball, president and general manager of the Ball & Ball Carbureter Co., died Saturday after an illness of two months. He was known widely in the engineering field by his connection with the development of the high speed engine prior to engaging in the carbureter business. He organized the Ball Engine Co., Erie, Pa.; the Ball & Wood Engine Co., of Elizabeth, N. J., and the American Engine Co., of Bound Brook, N. J., prior to coming to Detroit. He had been in the carbureter business ten years.

Dodge Plant Closes to Adjust Activities

Will Vary Operations from Week
to Week as Conditions
Warrant

DETROIT, Nov. 17—Operations at the Dodge plant came to a halt last night for the balance of the week to permit of readjustments. The order closing the plant for four days of this week, declared General Manager Haynes, would be followed by a similar order next week and for other weeks thereafter until necessary adjustments and alterations are made.

Coming on the heels of the dealer conference which the company has just held the action of curtailing production to a two-day a week basis is causing much comment. Manufacturers had anticipated that the close of the conference would witness a curtailed schedule but an actual closing for any part of the work week was not expected.

Haynes denied that only men with dependents would be employed and said Dodge, like other plants, would cull out the weaklings and inefficient. With these disposed of greater favor would be shown in employment to those men with families. The factory was about 15 per cent over-manned, he said, owing to the former absentee percentage being converted to steady attendance through fear of dismissal in the depression period.

Dodge has been employing about 24,000 workers for the past two months. About 6000 would be forced out of work through the elimination of excess labor, Haynes said. As to the two-day week, he said this was not definite but that the factory would be down a few days each week indefinitely until adjustments were completed.

In October Dodge, with Ford and Buick, were the only plants in the Detroit district to maintain a semblance of normal production.

Buick Cuts Production, Adopts Six-Hour Day

DETROIT, Nov. 17—Buick Motor Car Co. has reduced production from 540 cars a day to 350, and will operate temporarily on a six-hour day basis. The company's announcement to its employees said it had adopted the shorter work day as affording the greatest good to the greatest number during the time of lessened production. Further reductions in the organization will not be made unless conditions which control the general manufacturing and selling situation make them imperative.

Curtailment of production was made necessary, the company said, to meet the business emergency and readjustment affecting all industry. By spreading the production over the greatest extent of the organization it aimed to reduce the discomforts of the readjustment to a minimum. Hope is expressed in the an-

nouncement that conditions dictating the reduced output will be overcome by the close of the year.

Cadillac has not been affected and is running on the schedule of 20,000 cars in 1920 which was laid out eighteen months ago. Officials report that the demand continues to exceed the supply and if there are no cancellations the company will enter the new year with practically 5000 cars signed up. In a few months the new Cadillac plant providing for an output of 33 1/3 per cent higher than the present factory will be opened. It is expected to build 27,000 cars a year.

White Motor Elects New Board Chairman

CLEVELAND, Nov. 15—Homer H. Johnson of Cleveland, head of one of the best known law firms in the Middle West, has been elected chairman of the Board of Directors of the White Motor Co. He will take the place made vacant by the death of his law partner, M. B. Johnson.

Johnson was chosen a director of the White company last week, and then came his elevation to the chairmanship of the board. He was active in war work until recently, having served for a time as fuel director for Ohio, and subsequently went to France as a member of the American Liquidation Committee.

At the meeting at which Johnson was chosen for the important post, the directors declared the regular quarterly dividend of \$1 a share, payable Dec. 31. There has been practically no change in production at the White company plant, despite a general slowing up of industry in this city. The company continues to work a day and night shift in the manufacture of motor trucks. Continuity of employment is one of the cardinal policies to keep down labor turnover.

Schroeder Quits Army to Make Flowmeter

DAYTON, OHIO, Nov. 17—Captain R. W. Schroeder, of the air service, noted as holder of the world's altitude record for airplanes and pilot of the American Air Service Entry in the Gordon-Bennett airplane race, has been discharged from the army.

Captain Schroeder will enter into the manufacture of the Schroeder Flowmeter perfected by him while at McCook Field. He will be associated with a manufacturing concern in Chicago which has undertaken the development and marketing of his device. The unit is a vertical type to be mounted on the dash and reads directly in miles per gallon fuel consumption.

BULL TRACTOR PLANTS SOLD
INDIANAPOLIS, Nov. 16—Property of the Bull Tractor and the Madison Motor Car Co., including the plant at Anderson, Ind., was sold here to-day for \$120,000 to L. Goldstein's Sons, of Philadelphia, owners of the American Motor Parts Co. Besides the real estate and buildings at Anderson the sale included the motor parts of the tractor and motor companies there and at Minneapolis.

Nelson Asks Ruling on Indebtedness

Reorganized Company Files
Bankruptcy Petition to
Straighten Out Standing

DETROIT, Nov. 12—The E. A. Nelson Motor Car Co., which recently was reorganized as the E. A. Nelson Automobile Co., a Delaware corporation, filed a petition in bankruptcy in the Federal Court to-day listing liabilities of \$73,166.65 and no assets other than personal property of undetermined value. Of the total indebtedness \$66,946.52 represents unsecured claims and the petition lists among other debts approximately \$5500 due the government as taxes on automobiles manufactured and approximately \$720 city and county taxes.

Among the unsecured creditors are the Burton Lowery Co., Detroit; Fulton Drop Forge Co., Ohio; Michigan Metal Stamping Co., Detroit, and McCord & Co., Chicago. Notes aggregating \$17,901.75, all payable through the National Bank of Commerce, include two payable to the Turner Moore Mfg. Co., amounting to \$8,012.12; two payable to the Burton Lowery Co., aggregating \$4,270.60; the Buffalo Pressed Steel Co., \$2,743.55 and the United States Light and Heat Co., \$1000.

Officials of the company said to-day the petition was filed with the view of having the court fix liability for the indebtedness between the old and new company and declared the present company would continue operation as soon as the court had rendered its decision. The petition was filed by E. A. Nelson, president of the E. A. Nelson Motor Car Co., who was succeeded by J. A. Hibbard when the reorganization was effected. An agreement dated March 23, 1920, assigning 52,000 shares of stock in the E. A. Nelson Motor Car Co., to the E. A. Nelson Automobile Co., is referred to in the petition.

The former company was organized four years ago but encountered financial difficulties in the early part of this year, at which time the liabilities were assumed by the reorganized company under the terms of the stock agreement.

RACE REGULATIONS FIXED

LONDON, Nov. 8 (*Special Correspondence*)—Regulations have been announced for the international tourist trophy races which will be held next year under the auspices of the Royal Automobile Club. There will be two contests with one day devoted to each. They will be for standard cars fitted with engines of 3000 cu. cm. (183 cu. in.) and 1500 cu. cm., respectively. The club also is preparing to consider the advisability of holding a fuel and oil consumption test but it is suggested that this should be held apart from the actual races. The contests will be run on the Isle of Man in June and the distance will be about 300 miles.

Rail Service Cut as Trucks Increase

Efficiency of Short Haul Service Shown on Delaware-Maryland Peninsula

WILMINGTON, DEL., Nov. 15—The aggressiveness of the motor truck engaged in commercial traffic between Philadelphia, Wilmington, Baltimore and the Delaware-Maryland peninsula has caused the Pennsylvania railroad to curtail its way freight traffic on the peninsula. Heretofore, except during the war, when it was possible, these trains were operated daily to accommodate the traffic between the cities and the rural section, but motor truck lines have begun to operate all over the peninsula, with the result that the railroad company has announced that hereafter way freights will be operated only every other day.

Regular motor trains of trucks ply between Philadelphia, Wilmington, Baltimore and the territory down the peninsula, which comprises all of the State of Delaware and the eastern shore of Maryland. Started in a small way, this traffic has developed to such an extent the railroad cannot profitably compete.

This traffic applies not only to shipments from the country to the city, but also to the shipments from the city wholesale houses to the country. Then again, by the time a retailer pays his freight and cartage from the railroad station, he is usually paying more for the goods than they cost delivered at the door by the wholesaler's truck.

Traffic Bureau Plan Rounded Out by N.A.C.C.

NEW YORK, Nov. 15—Considerable progress is being made by F. W. Fenn, secretary of the motor truck committee of the National Automobile Chamber of Commerce, in his campaign to have a transportation committee included in the organization of every Chamber of Commerce in the United States.

This committee, as proposed by Fenn, would be composed of one or two manufacturers, a prominent railroad official, a motor transport operator and one or two farmers. If the city is located on a waterway a marine transport operator would be included in the membership. Attached to the committee would be a traffic manager and a farm secretary.

It would be the duty of the farm secretary to co-operate with farm bureaus for the development of outlying rural districts to insure a market for the farmers' products and thereby increase production. New markets would be opened by the use of motor trucks. One phase of the work of the committee would be to find work for trucks and establish tariffs which would insure the confidence of shippers.

Short haul, less than carload lot business, would be separated from the long haul business.

Tokio's Manless Rickshaw

WASHINGTON, Nov. 13—The "jinriemobile" has made its appearance in Tokio. It is the body of a "rickshaw" with a motor in it, possibly the tiniest automobile for everyday utility in the world. It fits as snugly in the narrower streets of Tokio as the "kuruma" itself—that being the Japanese name for "jinriemobile."

The innovation is called the "motor kurumaya." It makes it possible for the coolie to ride as well as his fare and permits of far greater speed. The manless rickshaw has its motor on the ground under the seat.

New York Truck Show to Stress Highway Use

NEW YORK, Nov. 13—Motor truck manufacturers are exhibiting great interest in the Highway Transportation Show Jan. 3 to 8, because of the effort being put forth by the show committee to make the exhibition one of great educational value and quite different from all previous still motor truck shows. Many circus stunts and contests will be staged and prominent speakers obtained to draw attendance. Emphasis is being made that it will be a Highway Transportation Show instead of a mere motor truck show.

Each day of the week has been set aside to cover one important phase of highway transportation, both in the exhibits to be featured and in the selection of speakers. Monday, Jan. 3, will be known as Opening Day; Tuesday, Army Day; Wednesday, Motor Accident Prevention Day; Thursday, Transportation Day; Friday, Farmers' Day, and Saturday, Motor Truck Association Day.

NEW YORK TO CLEAR STREETS

NEW YORK, Nov. 16—The city of New York has prepared on a large scale for snow removal work throughout the coming winter and will rely upon motor trucks and tractors principally to do the job.

The city has appropriated \$2,757,000 for equipment and \$1,370,000 for garages to house it. The new equipment, most of which has already been purchased, includes 212 5-ton White trucks, 100 2-ton Mack trucks, 150 4-wheel pull plows, 300 push plows, to be attached to the front of the trucks or tractors; 100 2-ton Cletracs, 50 4-ton Holt caterpillar trucks, three wrecking trucks, equipped with cranes; four ¾-ton delivery truck, and one mechanical snow loader.

As to old equipment, the city has 38 5-ton trucks, 500 department carts, 200 push plows and minor equipment.

Last winter the city's unpreparedness to fight the snow cost \$60,000,000 in delays and lost business. In preparing to combat snow obstruction the city has been supported by every business interest.

Packard Increases Earnings for Year

Surplus After Dividends \$3,884,027—Stockholders Get \$2,511,441 During Year

NEW YORK, Nov. 15—Packard Motor Car Co., for the fiscal year ended Aug. 31, 1920, reports net profits, after charges and taxes, of \$6,395,468, equivalent, after preferred dividends, to \$4.51 a share earned on the \$11,885,100 common stock (\$10 par value). This compares with net profits of \$5,433,634, or \$41.15 a share, on the \$11,840,930 common stock (\$100 par value) in 1919.

Consolidated income account for the year compares as follows:

	1920	1919
Net profits, after tax	\$6,395,468	\$5,433,634
Dividends	2,511,441	2,099,244
Surplus	\$3,884,027	\$3,334,390
Net profits, after tax	\$5,616,707	\$5,400,691
Dividends	1,270,388	1,470,636
Surplus	\$4,346,319	\$3,930,055

The balance sheet as of Aug. 31, 1920, compares as follows:

ASSETS		
	1920	1919
Property investment	\$21,988,430	\$15,994,393
Cash in sinking fund for retirem't prefer'd stock		270,000
Inventories	29,359,327	18,051,749
Accounts receivable	4,882,189	4,401,718
Defer'd installm't notes and bil's receivable	1,352,728	338,162
Miscellaneous investments	207,535	173,978
Liberty bonds and U. S. certificates of indebtedness		19,583,668
Liberty bonds purchased for employees, less amounts received		313,158
Cash	4,314,810	3,409,248
Deferred charges	703,258	562,142
Total	\$62,808,277	\$63,098,216
LIABILITIES		
Preferred stock	\$15,223,500	\$15,500,000
Common stock	11,885,100	11,840,930
Notes payable	5,000,000	5,000,000
Accounts payable and payrolls	4,087,549	4,846,370
Federal inc. and profits taxes, etc	3,354,456	8,284,796
Reserve for possible shrinkage value materials, etc	2,500,000	
Profit and loss surplus	20,757,672	16,992,250
Total	\$62,808,277	\$63,098,216

McLAUGHLIN HEADS A. I. C.

TORONTO, Nov. 12—R. S. McLaughlin, president of General Motors of Canada, Ltd., and W. T. Sampson, president of Gananque Spring & Axle Co., Ltd., were elected president and vice-president respectively of the Automotive Industries of Canada (the National Automobile Chamber of Commerce of the Dominion) at the annual meeting of the association held in Toronto to-day.

Credit Stimulates Buying of Tractors

International's New Policy Brings Increased Sales In Louisiana

NEW ORLEANS, LA., Nov. 12—The New Orleans branch office of the International Harvester Co. already is feeling the effect of the change from cash to term credit sales of tractors and other farm machinery to farmers of Louisiana and southern Mississippi, according to S. E. Foster, assistant manager, in charge of the local branch. This, the first break in the International's policy of demanding cash for farm power equipment, was announced beginning Nov. 1, and was almost immediately followed by another announcement that if there is any reduction in tractor or equipment prices between now and May 1, 1921, the purchasers of such tractors and equipment before the first of May will be given the benefit of such decline.

"This is not, however, to be taken as an indication that there will be any decline, because we do not expect any," said Mr. Foster.

"An instance of what the use of power equipment can do to stabilize an industry, especially the agricultural industry of a community," Foster continued, "was given when many farmers in southern Louisiana lost their mules from charbon this spring. Many of them wrote in, and told others as well, that they would have been at a standstill, would have been unable to do their spring cultivating and planting, and would have harvested no crops at all, if it had not been for tractors. This started 'tractor infection' in southern Louisiana. When we once get a tractor in a community, and doing good work, the use of tractors spreads like hay fever and the farmers all around begin to want tractors. Now that they can get these tractors on easy terms, with light interest on deferred payments, I expect a big increase in the sales, especially of small tractors, to small farmers, to those who really need such improved machinery, but have been unable to get it so far, owing to the all-cash payment."

MAGUIRE JOINS HARE MOTORS

SPRINGFIELD, OHIO, Nov. 15—Peter W. Maguire, who has been treasurer of the Kelly-Springfield Motor Truck Co., left to-day for New York, where he will become identified with the Hare Motors Corp. He will hereafter be known as special representative. Maguire's first work will be to assist in the consolidation of the retail sales outlets of the Kelly company and the Hare corporation.

TO ASSEMBLE TRUCK BODIES

LANSING, MICH., Nov. 15—The United Automotive Body Co. of Springboro, Pa., has leased a building in this city to be used as a body assembling

plant for furnishing truck bodies to the Reo and Oldsmobile factories. The building contains 27,200 sq. ft. of floor space and the company plans also to assemble Ford bodies here. Establishment of the assembling plant and warehouse here was decided upon to obviate the necessity of indefinite delay when the factories were compelled to await delivery of bodies from the company's plants in Pennsylvania and Greenfield, Ohio.

Michigan Prepared to Keep Roads Clear

DETROIT, Nov. 15—County road commissioners, truck factory officials and automotive executives formulated plans for keeping the roadways of southeastern Michigan free from snow during the next six months at a meeting in the rooms of the Detroit Automobile Club in Hotel Tuller. The work is to be undertaken on a co-operative basis by county authorities and truck manufacturers. Snow plows attached to the front of motor trucks will form the principal part of the snow removing equipment. In emergencies labor from truck factories will be furnished to aid county employees. All the truck lines in the southeastern section are included in the list to be worked continuously.

A committee to have charge of the work consists of G. C. Dillman, of the State Highway Department; E. J. Strong, Buick Motor Co.; B. C. Foy, Reo Motor Car Co.; K. N. Moore, National Automobile Chamber of Commerce; R. W. Roberts, State Highway Department; F. E. Beard, representing St. Clair county; and J. L. Richards, B. C. Tiney, and R. B. McPherson, representing Lenawee, Monroe and Livingston counties respectively.

PONTIAC DISSOLUTION ASKED

PONTIAC, MICH., Nov. 15—Dissolution of the Pontiac Body Co. is asked in a petition filed by George A. Brown, N. H. Parker and A. W. King, three of four directors. The action is for the purpose of winding up the company's affairs and disbursing \$20,000 held in bank to the company's credit and \$7,778.90 due from the General Motors Corp., which purchased the body company last October.

The company was organized in 1910 as the Monroe Body Co., and the name was changed in March, 1919. There has been a partial disbursement of the assets since the sale to General Motors and the nineteen stockholders interested are seeking final settlement.

JACOB WERTHEIM DIES

NEW YORK, Nov. 15—Jacob Wertheim, who had an active share in the development of the automobile industry and was at one time a director of the General Motors Corp., died at his home here yesterday at the age of sixty-two. He retired from business in 1913 but continued to take an active part in Jewish charities. From a humble beginning he became the head of the largest independent cigar manufacturing company in this country.

Predict Big Market to Open in Mexico

Texas Dealers Report Cars and Trucks Necessary for Recon- struction Now Starting

EL PASO, TEXAS, Nov. 12—As a result of the improved conditions in Mexico the automobile and motor truck trade in that country shows a wonderful increase, according to El Paso dealers, four of whom have just returned from a trip of investigation of trade prospects in several of the larger cities of that country. In this party were E. G. Perry, Lone Star Motor Co., F. M. Bannell, El Paso Overland Co., O. C. Youngblood, Pry Motor Co., and Sam Watkins of the Watkins Motor Co.

"The most striking thing in Mexico at the present time is its automobiles," said Bannell. "Few fine cars are to be seen. Of course there is a call for American capital, but that will be forthcoming. I look for the recovery of Mexico in shorter period of time than any country has ever recovered from like conditions. Our Mexican territory covers the State of Chihuahua. H. W. Klett, Mexican representative of the John N. Willys Export Corp. will arrive here soon, and we hope to go over the Mexican situation immediately. In fact, we have a carload of Overlands sold in Chihuahua now, but cannot move them. Conditions are undoubtedly better than ever. All classes are united for a speedy rehabilitation of our sister republic."

"There is a great opening for trucks in Mexico," said Perry. "Many mines situated many miles off the railroad make a big demand for heavy trucks. I look for a speedy recovery of Mexico and an enormous demand for American automobiles and trucks. In fact, that demand is now evident."

Need Cars for Reconstruction

"The need of automobiles and trucks in the reconstruction of Mexico is evident to any traveler through the southern republic," said Youngblood. "It is not a case of selling cars but of getting the cars to them. American capital must and will play its part. Our territory in Mexico is the State of Chihuahua. We are preparing to establish four agencies at an early date. I expect to see a prosperous Mexico in a remarkably short time."

"The demand for automobiles and trucks in Mexico was quite evident to all members of our party. They will both play a very prominent part in putting Mexico on her feet." This is the opinion of Sam Watkins. "Right now it is merely a question of getting automotive machinery to the Mexican people and the sooner we get there the sooner additional large orders will be forthcoming. It is up to us to help, which is being done rapidly by El Pasoans and others and which it is quite evident Mexico fully appreciates."

Chamber Predicts Lower Price Level

United States Commerce Organization Expects No Financial Crash, However

WASHINGTON, Nov. 12—Further reduction in prices is anticipated in a report of the committee on statistics of the Chamber of Commerce of the United States, which covers business conditions for October. No marked financial disturbance is in sight, despite expressions to the contrary in certain quarters, the committee pointed out.

"Just now the need of the country seems to be for more consumption rather than more production," Archer Wall Douglas, chairman, announced. "Talk of stabilizing prices, so as to save the situation, no longer interests any one save a few hopeless theorists. The laws of supply and demand will in time regulate matters."

"Theories of great and startling changes in the framework and organization of manufacturing life are dying out in view of the exigencies of the occasion as to how to maintain adequate production at reasonably remunerative prices. Industrial life, in time, will doubtless be more democratized than at present, but we are not headed in the direction of running factories by committees."

"The entire commercial world is setting its house in order by reducing commitments, collecting outstanding accounts, and bringing down stocks of merchandise to the requirements of reduced demand. And it is all being done soberly and advisedly. All are awaiting that psychological time, the first of the year, when the current of events and the general trend shall be more readily discerned and more easily interpreted. Meanwhile, much definite action is being postponed. Merchandise stocks in general will then be far less than for several years."

PATCH TO MAKE TRACTOR

STEVENS POINT, WIS., Nov. 15—A. J. Patch, formerly chief engineer of the Hart-Parr Co., Charles City, Iowa, has organized, in association with a number of prominent Wisconsin business men, a new corporation known as the Farmers' Tractor Corp., with an authorized capitalization of \$500,000. It has selected Stevens Point, Wis., as headquarters, and next spring will build a machine shop and assembling plant, later adding a foundry. William Mainland of Oshkosh, Wis., is assisting Patch in the organization. The new tractor will be known as the M. P. M.

FORM SMITH BATTERY COMPANY

ATLANTA, Nov. 12—The F. V. L. Smith Battery Co., manufacturers, has been organized and incorporated in Atlanta with a capital stock of \$300,000. A charter has already been obtained and

preparations are now under way for the construction here of a large plant to manufacture electrical batteries. The plant is to have a production capacity of 1000 batteries per day and will establish a chain of service stations all over the South. J. W. Moore, president of the Atlanta Utility Works, was named vice-president, and S. L. Manson, an official of the American Telephone and Telegraph Co., was named secretary. Offices have been opened in New York

Canadian Ford Claims Share of Indian Trade

FORD, ONT., Nov. 15—Canadian Ford motor cars formed over 50 per cent of the total imports of motor cars into India in the past fiscal year. Ford Motor Co. of Canada, Ltd., comments on India's imports of motor cars as follows:

"We notice that the United States is credited with having shipped 9353 of the 9925 motor cars imported into India during the twelve months ending March, 1920. We had considerable correspondence with the Customs authorities and the statistical offices in India regarding the showing of Canadian shipments as separately from the United States. For some reason or other all Ford cars shipped into India up to the present time have been listed as American cars, when they actually are Canadian-made."

Unfortunately, a number of them have been shipped from the port of New York, owing to our inability to secure ocean space on steamers leaving Canadian ports. Nevertheless, the origin is British, and we would like due prominence to be given to this fact. As a matter of fact, during the period under review we manufactured in our plant at Ford, Ont., and shipped direct to India, either through the ports of Montreal or St. John, Canada, or the port of New York, 5532 Ford cars of all models."

Pennsy and Gordon Reduce Tire Prices

NEW YORK, Nov. 17—Price reductions have been made by the Pennsylvania Rubber Co. and the Gordon Tire & Rubber Co., the former with factories and general offices at Jeanette, Pa., and the latter at Canton, Ohio. Reduction in each case are on both cord and fabric tires and on tubes.

The Pennsylvania cuts are approximately 3½ per cent on cords; 7½ per cent on fabrics, and 8½ per cent on tubes.

The Gordon reductions are about 14½ per cent on tubes; 15 per cent on fabric tires, and 17 per cent on cord tires.

TIRE MARKET IN SUMATRA

WASHINGTON, Nov. 12—Sumatra offers a good market for automobile tires, according to a report received from the American consul to-day. Over 2000 motor vehicles have been licensed in the Medan consular district and tire imports amounted to \$200,000 in 1919. Statistics for the first-half of this year show a decided increase in imports.

METAL MARKETS

REGRETTABLE though it may be, and compels the statement that the iron and steel markets have not yet reached that sackcloth and ashes period of repentance when buyers would be justified in having compassion with mills left without any backlog of orders. The market appears to be a buyers' affair only if they stay out of it for the present. This is especially true of the pig iron situation, which would adjust itself speedily to the changed order of things were it not for the Bourbon attitude of a number of leading factors who preach in their weekly market reports the early advent of a "revival," by which they mean a return to pre-slump levels for pig iron. In spite of all the assertions that pig iron can not be made and sold at around \$35 to-day, once buyers show that they will not pay more than that level it will be made and sold for that price. The copper market furnishes the best proof of this. When the red metal declined to below 15c., there was loud gnashing of teeth that with average producing costs at around 18c. no producer could mine and refine copper profitably in a 15c. market. And now we find that some of the producers frankly admit that they can make a reasonable profit in selling their red metal at 15c. The Calumet & Hecla has set the pace for the other copper producers by lopping 15 per cent off wages and salaries. In conditions such as those that now confront American industry, it is an established economic axiom that the market price always is that of the lowest cost producer. And that is exactly what will come to pass in the pig iron market. A few furnaces will have the courage to prune down their costs and the others will have to follow. Meanwhile, however, come complaints from Middle West foundries specializing in automotive castings that collections are dishearteningly slow. It is obvious that the automotive industry will benefit itself by placing these foundries in a position to avail themselves of bargain offers of pig iron, when opportunities to take on low-priced pig materialize. In the market for semifinished and finished steel the process of equalization on the basis of United States Steel Corp.'s prices progresses slowly but surely.

Pig Iron—Valley foundry iron has been offered at as low as \$40, furnace, but remembering that a year ago the market was about \$10 lower and that many commodity prices have receded to the late 1919 levels, foundries are almost a unit in holding off.

Steel—Closing down of the United Alloy Steel Co.'s plant emphasizes the utter absence of demand for alloy steels in automotive manufactures. Cold rolled steel makers are also minus orders for want of automotive inquiries. It is expected that a Detroit manufacturer of medium-priced passenger cars will put out inquiries shortly for 14,000 tons of sheets for first quarter delivery.

Aluminum—The market is lifeless. Importations of sheets and ingots continue to add to the supply, but domestic output has been greatly curtailed. Broader use of aluminum in automotive castings is portended by continuingly successful laboratory experiments.

Lead—The price of lead was further reduced Wednesday to \$10 a ton when the American Smelting & Refining Co.'s quotation became operative. Prices of 6½ cents New York and East St. Louis were the lowest since October 1919. Outside market rules about ¼ cent lower.

Tin—Some consumers bought Straits at around 36c. The market is quiet.

INDUSTRIAL NOTES

Ideal Engine Co., Lansing, Mich., has purchased the plant of the Lansing Body Co. and will use it in the manufacture of power lawn mowers by the Ideal Power Lawn Mower Co. The power lawn mower is the result of efforts of R. E. Olds and Fay M. Seeley, who spent much time developing a small tractor to push three 30-inch mowers to supply a demand from city parks, country clubs and golf clubs.

Yates & Johnson Mfg. Co., Chippewa Falls, Wis., organized a year ago to engage in the foundry and machine shop business, has changed its corporate style to Northlite Mfg. Co. and increased its capital stock from \$25,000 to \$100,000. It is erecting plant additions and will put in production, besides gas engines, a new design of electro-generating unit for isolated places.

American Bosch Magneto Corp. has enlarged its sales personnel both at the main plant and at its branches. T. C. Miller has been made sales manager for the Eastern district. W. G. Brown for the Western district and M. Tost for the Central district. The staff of the general sales department has been augmented by the addition of four new men.

Master Tire & Rubber Co., Dayton, Ohio, has started production of a one-size cord tire for small cars. Through specializing on this one size, the company expects to greatly reduce operating costs. One unit is now working and another will be added in the Spring. When operating fully the company will make 2000 tires daily.

Ames Carburetor Co. is the new style adopted by the Hexmen Moto Co. of Racine, Wis., which was established a year ago to manufacture a new type of auxiliary carbureting device for internal combustion engines. The company has developed carbureters as well as the auxiliary device.

Martin-Parry Corp. has opened branches in New York and Atlanta to make distribution more readily. Each branch carries a full line of bodies and plants. E. A. McGrew is in charge of the New York branch and R. G. Seibert the Atlanta.

Goodluck Rubber Co., Buffalo, has arranged to purchase the right to manufacture Climax tubes and Mexo tires in New York State. Climax Rubber has acquired a plant in Delaware which will be used to manufacture Mexo tires.

S. W. Merritt Co., which recently increased its capitalization from \$100,000 to \$1,100,000, will soon start production of its new farm light plant. Present plans call for the manufacture of 1500 plants in 1921.

Waltham Watch Co. has laid off two hundred employees in the clock and speedometer departments due to the slump in the automobile business.

Armorcord Rubber Co., Morgantown, W. Va., has started production on tubes and expects to reach capacity within a short time.

Oldsmar Tractor Co., Oldsmar, Fla., has erected a \$50,000 addition to its plant.

OLIVER CHANGES OWNERSHIP

MILWAUKEE, Nov. 15—The Oliver Mfg. Co. of Chicago, one of the pioneer manufacturers of lifting jacks in this country, has been acquired by Milwaukee interests represented by Helmus B. Wells, for fourteen years secretary of the Northwestern Malleable Iron Co., Milwaukee. The Oliver Mfg. Co. of Milwaukee has

been incorporated in Wisconsin with \$75,000 capital to take over the business. The plant will be moved from Chicago to Milwaukee and enlarge its production to include wrenches, tools, etc. Wells takes the general management, although retaining an interest in the Northwestern foundry.

Union Steel Company
to Build "Vanderbilt"

CHICAGO, Nov. 14—The Union Steel Mfg. Co., manufacturers of tools and automobile parts and equipment, has purchased a plant in Brazil, Ind., with 60,000 feet of space on one floor and three acres of ground for expansion. It will move its entire equipment from Chicago during the next sixty days.

The company plans to manufacture an eight-cylinder-in-line car to be known as the "Vanderbilt." The chassis price is to be \$4,000 and bodies will be offered ranging in price from \$2,500 to \$7,500.

A. J. L. Dueth, general manager, has been identified with the American automobile industry for many years and has also had experience abroad. The company figures on employing 300 men. It is capitalized at \$250,000 and is an Illinois corporation. Ad. Judae of Bernard Judae & Co., is president.

New Gulfport Plant
to Open Next Month

GULFPORT, MISS., Nov. 12—The Richard Carter Automobile Company, which is to manufacture steam automobiles, trucks and tractors on the patents of Dr. Richard Carter of Hammond, La., will be in operation about Dec. 1, if work proceeds as rapidly during November as it has during the preceding two months. The company now has one all-daylight unit of its plant virtually completed, and the machinery for the plant is here, waiting installation. Dr. Carter is president and J. H. Rigg of Gulfport vice-president of the company, which is capitalized at \$1,000,000. The company bought 20 acres of land for the factory here, and began work as soon as the patents on automobile, stationary and marine steam engines were issued to Dr. Carter. The company also will manufacture a steam tractor, the body of which can be raised or lowered, for the cultivation of growing cane and corn and rice.

PACKARD BUILDS MORE TRUCKS

DETROIT, Nov. 15—Interesting facts in connection with Packard production are revealed in a financial statement issued by a brokerage firm yesterday. The statement shows the actual production of Packard cars in 1919 to have been 7040 while truck production amounted to 7305. Since the new Single Six went on the market in August, the report says, 316 had been produced up to and including Oct. 31. Production of 450 during November is anticipated. The company's export business in 1919 according to the statement amounted to 618 passenger cars and 541 trucks, valued at \$4,220,757.

Bank Credits

Written exclusively for AUTOMOTIVE INDUSTRIES by the Guaranty Trust Co., second largest bank in America.

NEW YORK, Nov. 18—Sharp declines in commodity prices last week and further evidences of slackening business activity were reflected in marked recessions in prices of securities, rails as well as industrials, a number of new low records for the year being made near the week end.

Call money rates were easier on Monday, the rate for renewals being 8½ per cent, after remaining at 9 per cent for three weeks. Time rates, however, hardened slightly last week, with the customary small volume of business. The offering of a new issue of Treasury certificates, dated Nov. 15, at 5½ per cent, the same rate as that paid on the previous issue, was a disappointment to those who had expected the rate would be lower and indicative of an early general easing of money rates.

The associated banks of the New York Clearing House succeeded last week in overcoming the previous week's deficit of \$1,306,790 in legal reserves, leaving a net excess of \$32,206,180. Loans were reduced \$47,937,000, and deposits \$27,841,000. For some weeks deposits had declined more rapidly than loans; indicative of the transfer of funds from this center.

The Federal Reserve Banks also showed an improved position. Gold holdings increased \$7,005,000 and total reserves were larger by \$10,282,000. Loans showed a decided contraction, total bills on hand declining \$53,990,000. Net deposits decreased \$20,159,000, and Federal Reserve note circulation was lower by \$25,195,000.

The ratio of gold reserves to Federal Reserve notes in circulation, after setting aside 35 per cent against net deposits, rose from 47 per cent to 47.9 per cent, the greatest single gain in the ratio in recent weeks.

WOULD RESTRAIN CAR SALES

BOSTON, Nov. 15—Referee in Bankruptcy Olmstead has been asked by Receiver George W. Reed of the Massachusetts Motors Co. to restrain certain creditors from disposing of 100 automobiles and \$62,000 in cash received from the sale of 70 other motor cars. Reed claimed the defendants seized the property before a petition in bankruptcy was filed, knowing the company was insolvent. The concerns named as defendants are the Federal Finance Corp., the Commercial Finance Corp., the Mutual Finance Corp., Guaranty Securities Corp., First Peoples Trust Co. and E. B. Lund Co.

EQUIPMENT SHIPPED ABROAD

KALAMAZOO, Nov. 15—Dearborn Garage Equipment Co. has shipped a carload of its special service station equipment to Buenos Ayres, also a like amount to Montevideo, Uruguay. In both cases the equipment goes to Ford dealers.

FINANCIAL NOTES

Hupp Motor Car Co., for the three months ending Sept. 30, reported net after taxes of \$843,535, or more than the company earned in any year prior to the fiscal year ending June 30, 1920, when \$2,668,299 was earned. Net for the quarter was equivalent to \$1.59 a share on the common after preferred dividends. Thus in this quarter the company earned its whole year's dividend by a 50 per cent margin. The balance sheet showed net quick assets of \$3,866,604, equivalent to \$5.80 a share on common after deducting preferred at par.

Denby Motor Truck Co. stockholders will meet Nov. 20 to act on the recommendation of the directors to increase the capital stock from \$500,000 to \$2,500,000. Under its plan \$2,000,000 of Class A common will be issued, for which present stockholders would be permitted to subscribe on a basis of eight shares of new stock for each share of stock now held. The directors expect to use the new money to pay off existing indebtedness and create a new working capital.

Simms Magneto Co. stockholders will vote on Nov. 30 on creating \$500,000 8 per cent. convertible debenture bonds, to be dated Jan. 1, 1921, convertible into common stock any time after two years at \$10 per share. They will also vote on increasing the authorized common stock from 100,000 shares (par \$5) to 200,000 shares, for the conversion of the bonds. The company has \$1,000,000 7 per cent cumulative preferred stock outstanding.

American Bosch Magneto Corp. directors will meet Nov. 19 and will order the regular quarterly distribution of \$2.50 a share. This distribution has been more than earned in the last quarter. For the full year the company should show earnings after taxes of \$15 a share. The final quarter will be the poorest, but allowing for this the final balance should reveal a 50 per cent margin of safety for the common dividend.

Pierce-Arrow Motor Car Co. on Aug. 1 showed its total current liabilities to be \$2,900,000 and current assets about \$18,400,000, leaving excess current assets of \$15,500,000, against its preferred stock issue of \$10,000,000. The company owes \$1,000,000 to banks, against which there is \$2,000,000 cash. Reserves for depreciation aggregate \$2,500,000. The company will not have to do any financing.

Belden Mfg. Co. stockholders rescinded action taken Aug. 10 increasing the company's capital from \$2,000,000 to \$4,000,000. Instead the capital will be increased \$1,000,000. The company makes electric wires and other appliances for the automobile industry.

Automotive Foundry Corp., established at LaCrosse, Wis., several months ago, has increased its authorized capitalization from \$100,000 to \$200,000 to finance the expansion of its business and the construction and equipment of works.

Chandler Motor Car Co. directors will meet this week to declare the regular quarterly dividend of \$2.50 a share. Officials anticipate a continuance of curtailed production until Spring. Sales are now better than shipments.

GENERAL MOTORS GETS FUNDS

NEW YORK, Nov. 15—Final payment will be made to the General Motors Corp. on Dec. 1 for the \$36,000,000 of stock which was purchased several months ago by English and Canadian interests. The corporation already has

received 10 per cent of the amount. The payment, which soon will be made, will strengthen materially the company's cash position. General Motors already has reduced its inventories substantially by the sale of finished products and manufacturing expense already has been curtailed so far as efficiency will permit.

Curtiss Shows Loss
in Balance for Year

NEW YORK, Nov. 15—The revised balance sheet of the Curtiss Aeroplane & Motor Co., as of June 30, last, discloses a profit and loss deficit of \$1,445,238. As compared with 1919 it shows:

Assets	1920	1919
Land, bldgs., equip., etc.	\$502,111	\$6,589,370
Gdwl. and pat.	1,933,045	2,353,461
Investments	907,126	702,400
Inventories	3,244,040	610,540
U. S. Govt. planes	1,766,923	.....
Accts. and notes rec. (less res.)	785,165	2,740,744
U. S. bonds	253,450	.....
Cash	111,003	2,858,390
Dfd. chgs.	143,827	217,324
Totals	\$9,646,690	\$16,072,229

Liabilities	1920	1919
Pfd. stock	\$5,275,800	\$6,000,000
Com. stock	1,090,300	1,090,300
U. S. Govt. mat. and mch.	983,687	.....
U. S. Govt. plne. acct.	1,190,000	4,000,000
Res. for pfd. stk. red.	600,000	300,000
Accts. pay., payrolls	515,715	557,056
acrd., etc.	222,410	.....
Dfd. Curtiss Eng. corp.	545,772	.....
Notes pay.	225,000	1,353,853
Advances	143,244	.....
Cust. init. pay.	.....	500,000
Fed. taxes	.....	2,271,020
Profit and loss surplus	1,145,238	.....
Profit and loss deficit	.....	.....
Totals	\$9,646,690	\$16,072,229

DEPOSIT TIME EXTENDED

NEW YORK, Nov. 16—The Maxwell-Chalmers management committee met today and extended until Nov. 27 the time for depositing claims against the companies under the reorganization plan. It is understood to be a certainty that the plan will be declared operative in the near future. The Maxwell and Chalmers companies have greatly strengthened their position in the past few weeks by the closing of the plants and the sale of a large number of completed vehicles.

SHE-BOY RUBBER ORGANIZED

SHEBOYGAN, WIS., Nov. 15—The She-Boy Rubber Co. has been organized by Milwaukee and Sheboygan, Wis., capital to manufacture tires, retreads and rubber goods generally. It is capitalized at \$675,000. A plant is being rebuilt and enlarged at Sheboygan, to be ready March 1. The president of the new concern is Leo Hofmeister of Milwaukee, head of the North Star Oil & Rubber Corp. and other rubber companies. The executive offices of the She-Boy company will be at 176-182 Sixteenth Street, Milwaukee. Besides Mr. Hofmeister, the officers are: Secretary and office manager, E. A. Hickey, Sheboygan; treasurer, C. M. Halderson, Valders, Wis.; vice-president, Dr. Daniel F. Knauth, Kiel, Wis.

MEN OF THE INDUSTRY

Will C. Heath, general superintendent of the main works of Fairbanks, Morse & Co. at Beloit, Wis., has been promoted to general manager, succeeding W. S. Hovey, who has been elected a vice-president, in charge of all plants and production, with headquarters in Chicago. Heath became general superintendent a year ago, when W. E. Seymour resigned to join the A. O. Smith Corp., Milwaukee, as vice-president and general manager. Heath is a graduate of Lewis Institute and the college of engineering, University of Wisconsin.

Paul Fitzpatrick, vice-president of the General Motors Acceptance Corp., sailed Nov. 10 on the "Cretic" for Genoa. As one of the leading experts in automobile financing in this country, Fitzpatrick will make a study of the possibilities offered by Europe for financial assistance, and at the same time will aid American industry in enlarging the export market for its products. He will visit Italy, France, Spain, Belgium, Holland and England.

L. C. Wilson, for the past two years general sales manager of the Chain Belt Co., Milwaukee, has been elected secretary of the Federal Malleable Co., West Allis, Wis., manufacturers of malleable castings, malleable chain and the rapid molding machine. He will be succeeded as sales manager at the Chain Belt Co. by Clifford F. Messinger.

Albert A. Dowd, founder and formerly president of the Service Eng. Co., New York, has severed his connections with that company and formed another company to be operated under the name of the Albert A. Dowd Eng. Co., with offices and drafting rooms at 131 West 39th Street, New York.

R. T. Wallace, of the Cleveland branch of the Keystone Oil & Mfg. Co. of Chicago, has been promoted to manager of the fuel and gas oil department. Omar Baldwin, of the Chicago office, will take his place in Cleveland. T. F. Thompson has been appointed manager of the light oil division.

Charles F. Van Sicklen has become associated with the Briggs & Stratton Co. of Milwaukee as vice-president in charge of sales. The Briggs & Stratton Co. is one of the largest makers in the world of electric switch panels, ignition switches and locks.

Keene B. Phillips has purchased an interest in the Automotive Sheet Metal Co. and has been named secretary and member of the board of directors. He will have charge of sales, enabling C. B. McDole to devote his efforts exclusively to production.

W. S. Oakes has returned to Kalamazoo and resumed his position as general superintendent of the Barley Motor Car Co. Oakes was granted a long leave of absence to recover from illness.

Col. Frank E. Smith has been elected a director and first vice-president of the Republic Motor Truck Co. to succeed W. J. Baxter, resigned.

A. R. Johnson has been appointed assistant sales and advertising manager of the Auburn Automobile Co., Auburn, Ind.

G. RAY HALL DIES

BATH, N. Y., Nov. 12—G. Ray Hall, one of the organizers of the Curtiss Aeroplane Co., died here, Nov. 1. He retired from business at the outbreak of the war, when the plant was taken over by the government. He leaves a widow and son.

Calendar

SHOWS

- Dec. 10-18—New York. Motor Boat Show. Grand Central Palace.
- Jan. 3-8—New York. Motor Truck Show. Motor Truck Ass'n of America, Twelfth Regiment Armory.
- Jan. 8-15—New York. National Passenger Car Show. Grand Central Palace. Auspices of N.A.C.C.
- Jan. 17-23—Milwaukee. Annual Automobile Show. Milwaukee Automotive Dealers' Ass'n.
- Jan. 22-27—San Francisco. Second Annual Pacific Coast Automotive Equipment Exposition. Auditorium.
- Jan. 22-29—Cleveland. Annual Passenger Car Show. Cleveland Mfr's & Dealers' Ass'n, Wignmore Coliseum.
- Jan. 22-29—Montreal. Annual Automobile Show. Montreal Automobile Trade Ass'n, Motordrome Bldg.
- Jan. 29-Feb. 4—Chicago. National Passenger Car Show. Coliseum. Auspices of N.A.C.C.
- Feb. 5-12—Minneapolis. Annual Automobile Show. Minneapolis Automobile Trade Ass'n.
- Feb. 6-12—Columbus. National Tractor Show. Columbus Tractor & Implement Club, Ohio State Fair Grounds.

- Feb. 12-19—Hartford, Conn., Annual Automobile Show. Hartford Automobile Dealers Ass'n, Armory, Arthur Fifoot, Mgr.
- Feb. 12-19—Kansas City. Annual Automobile Show. Kansas City Motor Car Dealers' Ass'n.
- Feb. 14-19—Winnipeg. Western Canada Automotive Equipment Show.
- Feb. 19-26—San Francisco. Fifth Annual Pacific Automobile Show. Exposition Auditorium, George Mahlgreen, Mgr.
- Feb. 21-26—Louisville. Annual Automobile Show. Louisville Automobile Dealers Ass'n, First Regiment Armory, C. L. Alderson, sec'y.
- Mar. 2-11—Des Moines. Annual Automobile Show. Coliseum, C. G. Van Vliet, Mgr.
- Mar. 5-12—Brooklyn. Annual Automobile Show. Brooklyn Motor Vehicle Dealers' Ass'n, 23d Regiment Armory, George C. Lewis, chairman.
- Mar. 7-12—Syracuse, N. Y., Annual Automobile Show. Syracuse Automobile Dealers Ass'n, Armory, Howard H. Smith, Mgr.
- Mar. 7-12—Indianapolis. Annual Automobile Show. Indiana-

polis Automotive "Trade Ass'n, Automobile Bldg., State Fair Grounds, John Orman, Mgr.

Mar. 12-19—Boston. Annual Automobile Show. Mechanics Bldg. and South Armory.

Mar. 14-19—Omaha. Annual Automobile Show. Omaha Automobile Trade Ass'n, Inc., Omaha Auditorium, C. G. Powell, Mgr.

April—Chattanooga, Tenn., Spring Automobile Show. Chattanooga Automotive Trade Ass'n, Sunday Tabernacle, C. A. Noone, sec'y.

Dec. 7-10—Cincinnati. Automobile Show in connection with Ohio Automotive Trade Ass'n Convention, auspices of Cincinnati Automotive Trade Ass'n, Music Hall, J. J. Behle, Mgr.

FOREIGN SHOWS

Nov. 29-Dec. 4—London. Cycle and Motorcycle Show. Cycle and Motorcycle Mfr's and Traders Union, Ltd., Olympia.

Jan. 7—Sydney. Australian Motor Show.

Jan. 22-29—Colombo. Ceylon Motor Show.

Feb. 7—Delhi, India. Delhi Motor Show.

CONVENTIONS

Nov. 30-Dec. 3—St. Louis. Third Annual Meeting and Exhibition. Automobile Accessories Branch, National Hardware Ass'n.

Dec. 7-10—New York. Annual meeting American Society of Mechanical Engineers. Engineering Societies Building.

Dec. 8-9—Cincinnati. Annual Convention, Ohio Automobile Jobbers' Association

Dec. 13—Washington. Convention of American Association of State Highway Officials.

Dec. 28-30—Chicago. Annual Meeting American Society of Agricultural Engineers.

Jan. 7—New York. Advertising Managers Council, Motor & Accessory Manufacturers' Ass'n.

Jan. 11-13—S. A. E. Annual Meeting, New York City.

Feb. 2-4—Chicago. First Annual Meeting, Automotive Electric Service Assn. Hotel La Salle.

Oct. 12-14, 1921—Chicago. Twenty-Eighth Annual Convention National Implement & Vehicle Ass'n.

RACES AND TOURS

Nov. 25—Los Angeles. Thanksgiving Day Speedway Classic, Beverly Hills Speedway.

S. A. E. Midwest Section Discusses Castor Oil

CHICAGO, Nov. 13—Mineral Oil Versus Castor Oil for the Lubrication of Internal Combustion Engines was the title of a paper presented by William F. Parish before the Midwest Section of the S. A. E. on Nov. 12. This paper dealt particularly with the use of castor oil as a lubricant for aircraft engines. It showed that castor oil may be very serviceable for certain classes of work when used for short periods of time, but in continuous use the oil develops characteristics that make it quite unsuitable and inferior in comparison with the proper mineral lubricating oil.

This is the first paper that has been presented to the S. A. E. on this topic and is based on test data taken from the official Government test records compiled by the Lubrication Department of the Air Service during the war. Parish was actively engaged in the development of the lubrication policy that was adopted by the Air Service, and also in the development of oil specifications for all branches of the service.

A short discussion which did not deal directly with Parish's paper was led by R. W. Smith of the Sinclair-R refining Co. This contained a report on a chemical analysis of the substance found in a motorcycle racing machine after a test with castor oil. The substance found, which caused clogging of the oil feed pipes, was very similar to rubber. Analysis revealed the fact that it was oxidized oil.

J. W. Stack of the Standard Oil Co.

discussed an analysis of a substance very similar to that which was found in the motorcycle engine, which he had obtained from an automobile engine using castor oil for lubrication.

Balanced Valve Motor to Locate in Wausau

WAUSAU, WIS., Nov. 12—The Balanced Valve Motor Co., a \$300,000 corporation which has been conducting an experimental shop in Milwaukee for the past year, will locate its permanent works and general offices in Wausau, Wis. The Wausau common council has provided a four-acre site. Local capital will invest from \$100,000 to \$125,000.

The company will manufacture passenger car, truck and tractor engines and a small, compact, 1-cylinder unit for electro-generators, pumps, etc. The small type will be placed in production first. The design is protected by basic patents and involves a new principle of valve mechanism, eliminating about 130 parts used in the ordinary 4-cylinder engine.

Officers of the corporation are: President and chief engineer, William M. Baumheckel, Milwaukee; vice-president, G. B. Rusco, West Bend; secretary, G. E. Pieper, Milwaukee; treasurer, E. W. Eberhardt, Milwaukee.

BLERIOT PLANT CLOSED

NEW YORK, Nov. 16—A dispatch from Paris states that the Bleriot airplane works have been closed indefinitely, throwing 2000 persons out of work. Rioting by employees was suppressed.

"Mercantile Express" Now in Production

DETROIT, Nov. 12—The Commerce Motor Car Co. has added a model which will be known as the Mercantile Express, with a capacity of 1500 to 2500 lb. The chassis will sell for \$1,350 and it will be provided in three types of bodies on a 127-in. wheelbase chassis. The bodies provided are the open express at \$1,550; flareboard express for \$1,450, and convertible stake type for \$1,505. In addition, an open cab top will be sold at \$85, or an all-weather pullman type cab for \$125.

The truck is assembled from standard units, including the Continental 3½ by 5-in., four-cylinder engine; Detroit Gear, truck type transmission; Zenith carbureter; Stewart vacuum system; Jacox steering gear; Spicer universal joints and Detroit Steel Product springs. It is equipped with Bijur electric lighting and starting and an Eisemann magneto. The truck is fitted with Goodyear pneumatic cord tires, all around. The truck, which will be known as model T, Mercantile Express, 1921 series, is now in production and is being shipped to dealers.

FARM MOTORIZER FORMED

RACINE, WIS., Nov. 15—A charter has been granted to the Farm Motorizer Co. of Racine, Wis., a new corporation with a capital of \$250,000, organized by James E. Shine, Leonard P. Baumbloot and H. O'Donnell to engage in the manufacture of power farm operating machinery, appliances, implements, etc.